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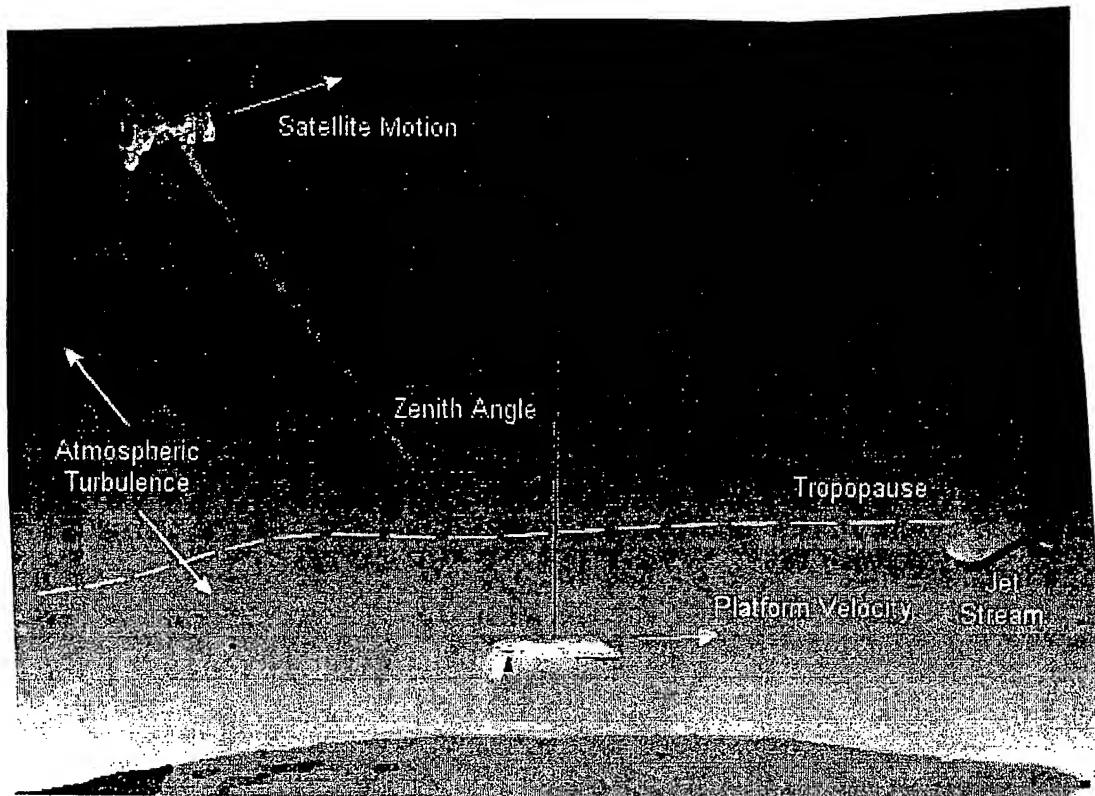


FIG 1A

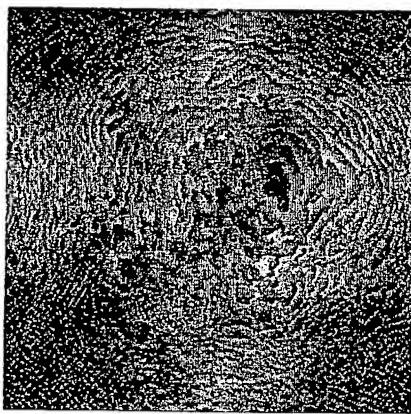
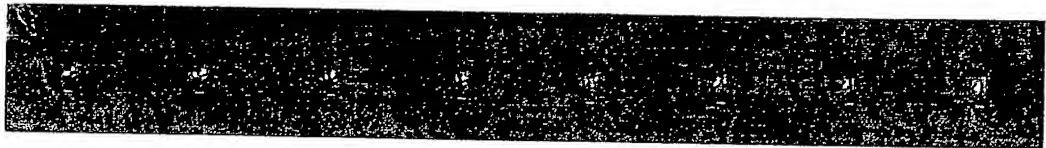
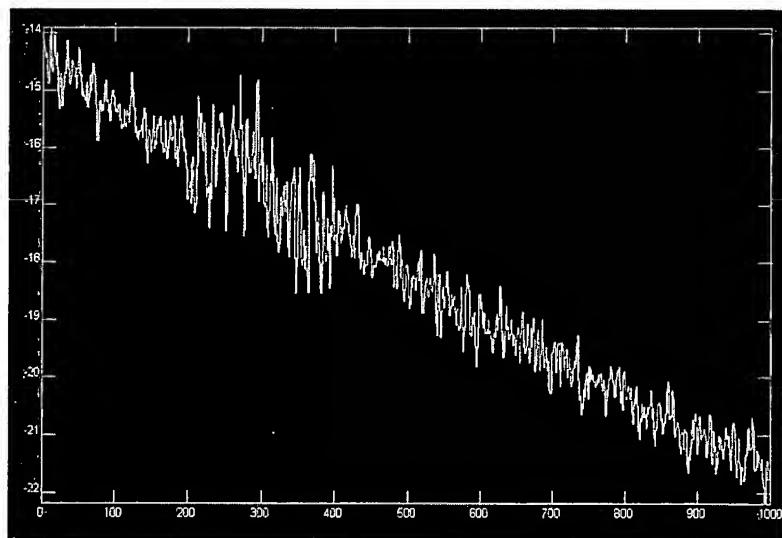


FIG 1B



Time Sequence of Beam Distribution at Satellite
(bar represents 10m at 1000km)

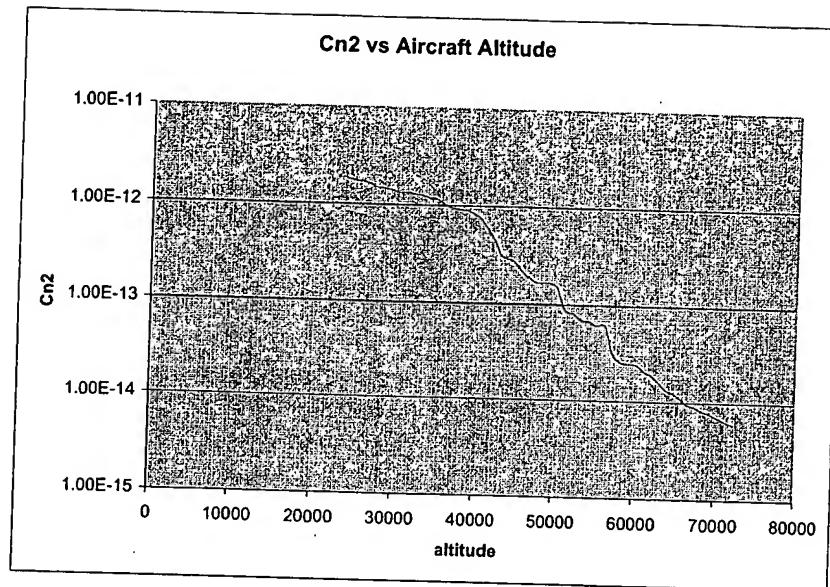
FIG. 1C



Simulated C_n^2 profile.

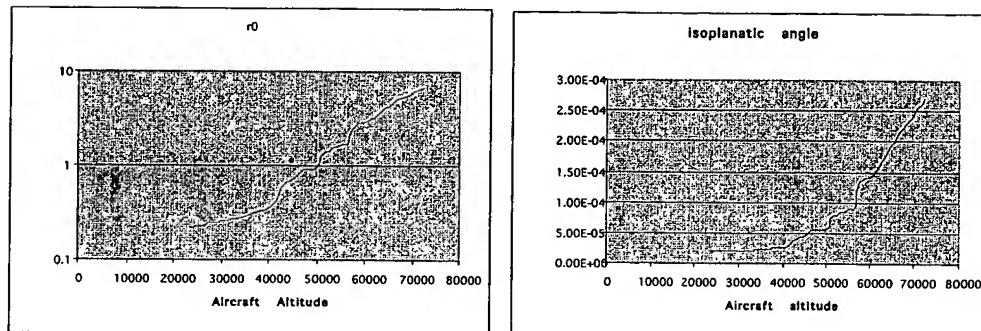
FIG. 1D

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Integrated C_n^2 versus aircraft altitude in feet

FIG 1E



Atmospheric coherence parameters versus aircraft altitude

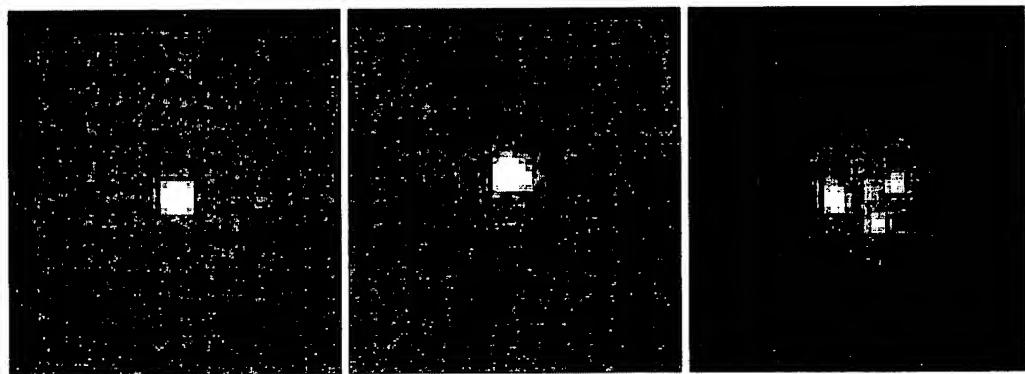
FIG 1F1

FIG 1F2



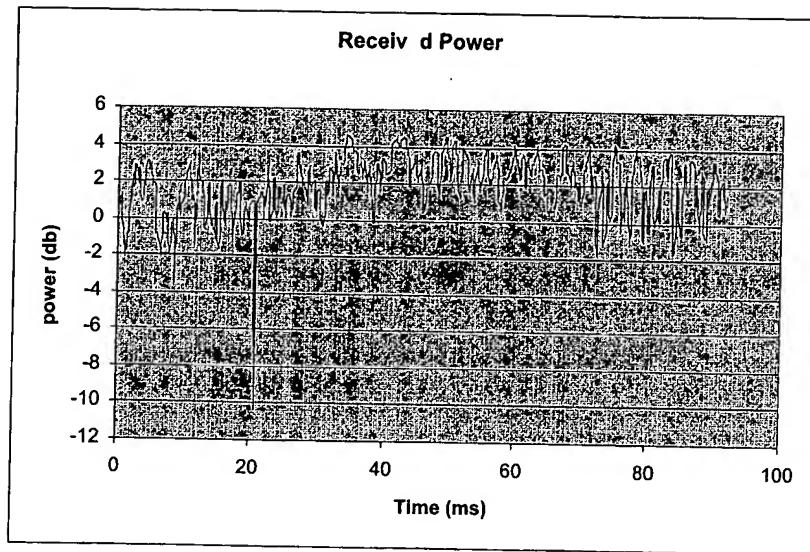
Simulated turbulence induced phase error

FIG. 1G



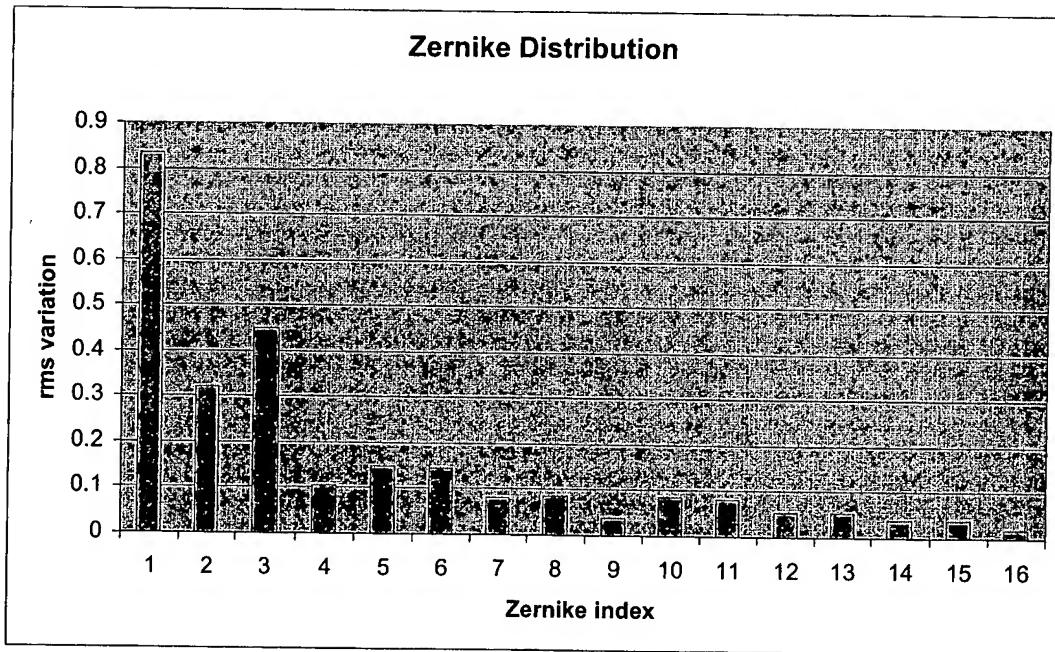
Diffraction limited beam profile (left) and typical beam profiles at satellite

FIG. 1H



Time Series of Received Power

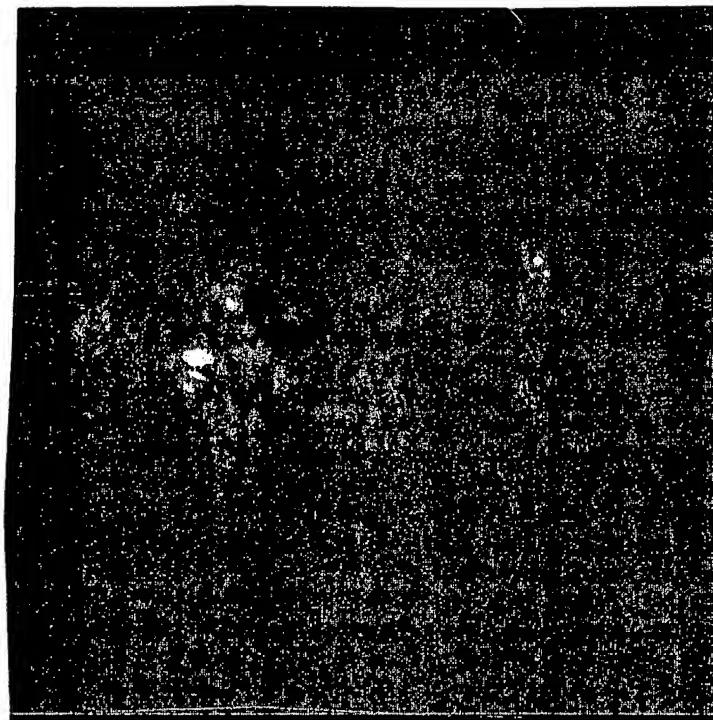
FIG. 1I



Temporal Variation in Lowest 15 Zernike terms

FIG. 1J

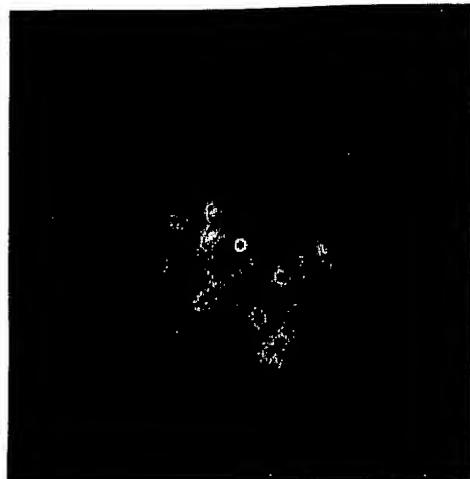
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Intensity distribution at receiver aperture

FIG. 1K

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Laser Beam
Speckle
Image

Spot during a deep fade event

FIG. 1M



Typical calculated spot at detector plane

FIG. 1L

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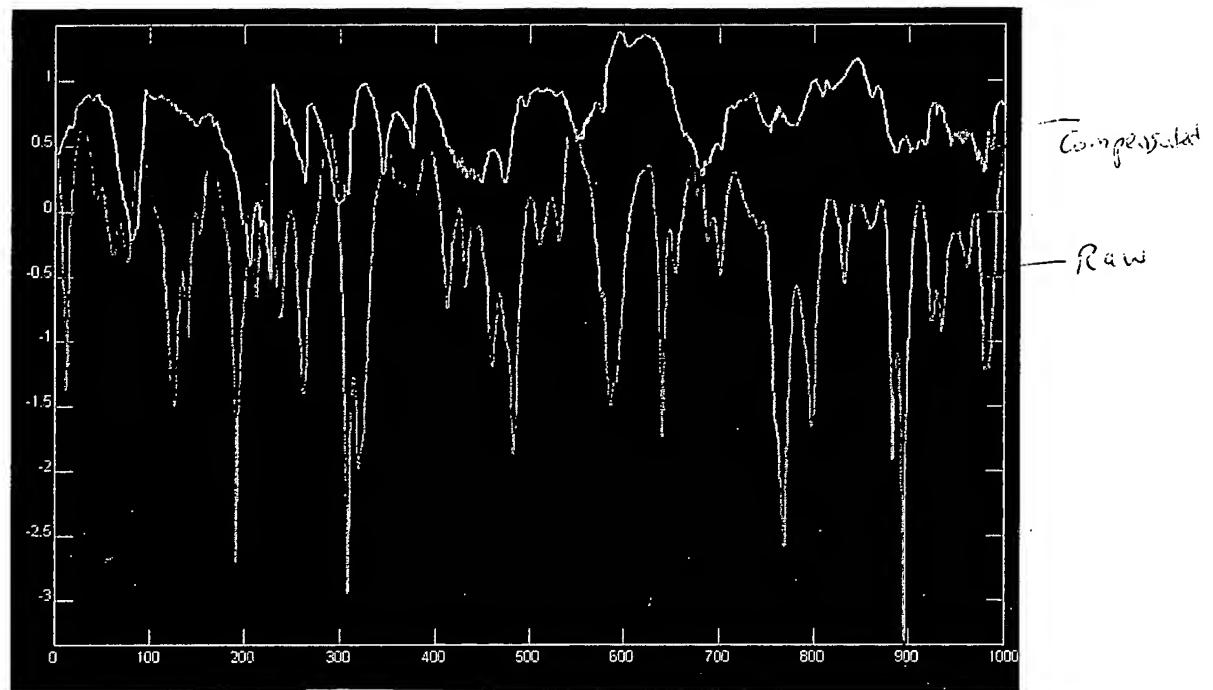


FIG.1N

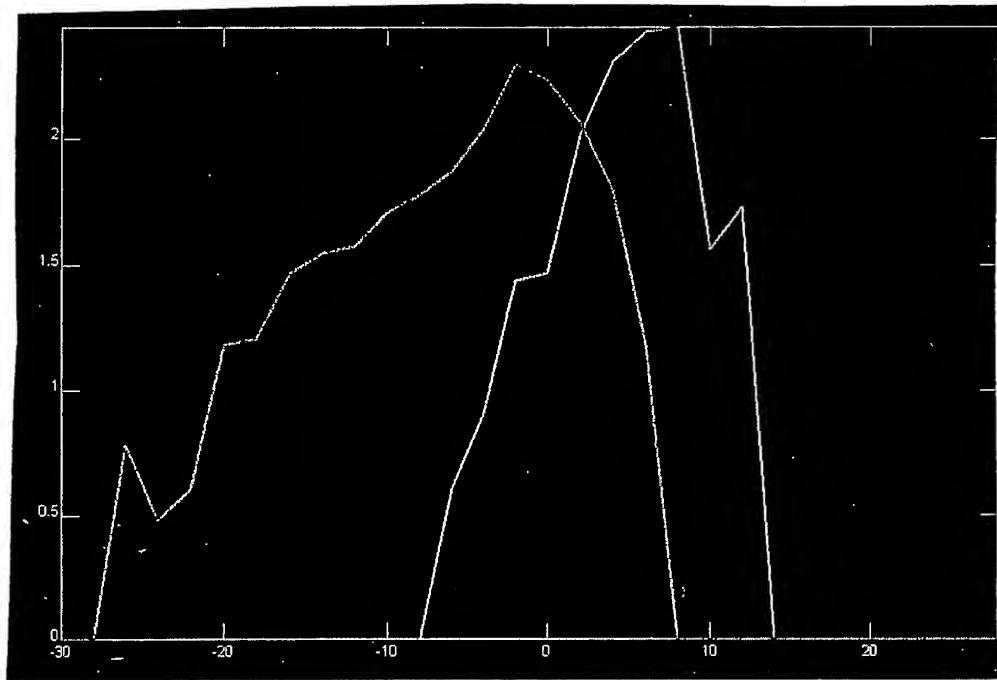


FIG.1O

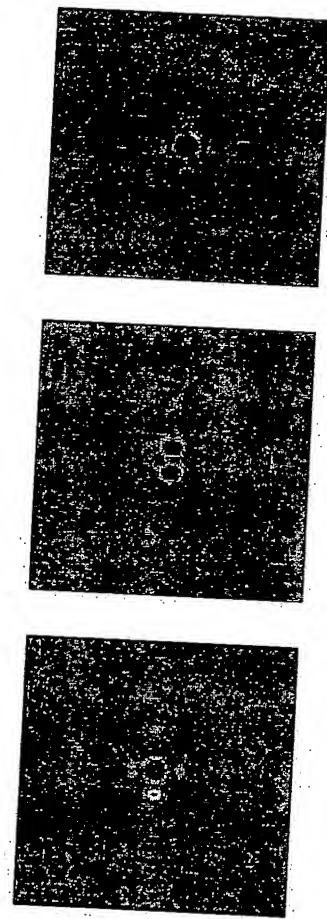
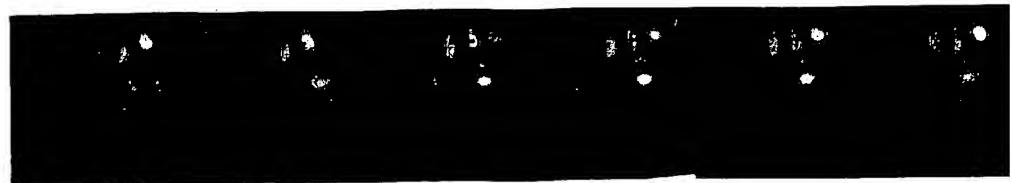


Figure 6
Blur spots formed by aperture with 0.2, 0.5, and 1.0 wave phase steps.

Fig 19



Modulation of a speckle pattern by a phase step .

FIG 1Q

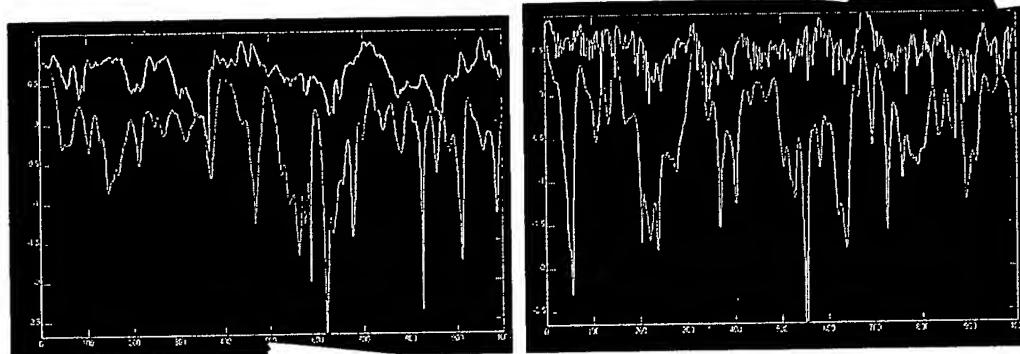
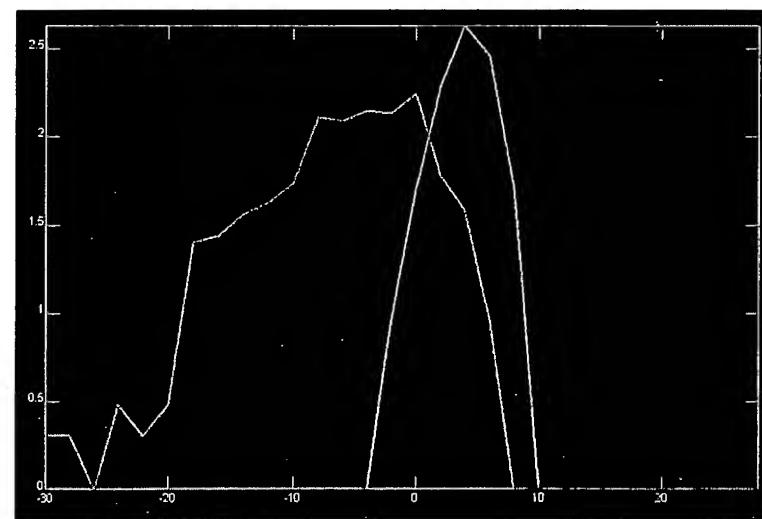


FIG. 1R1

FIG. 1R2

Log intensity vs. iteration number.
Top, 2X2 phase modulator; bottom, 4X4 phase modulator.



PDF for the data in fig 1R2

FIG 1S

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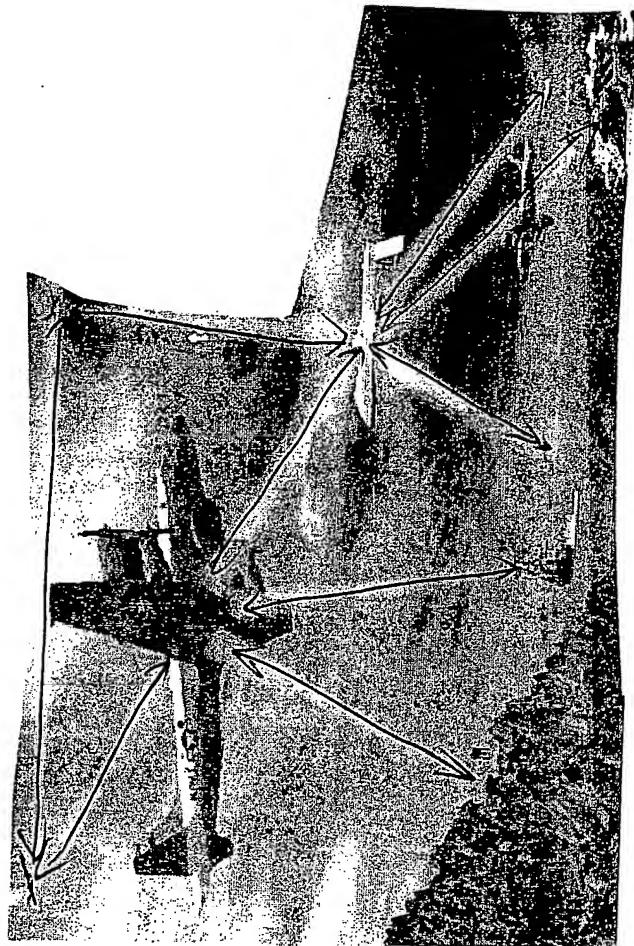


FIG 2A

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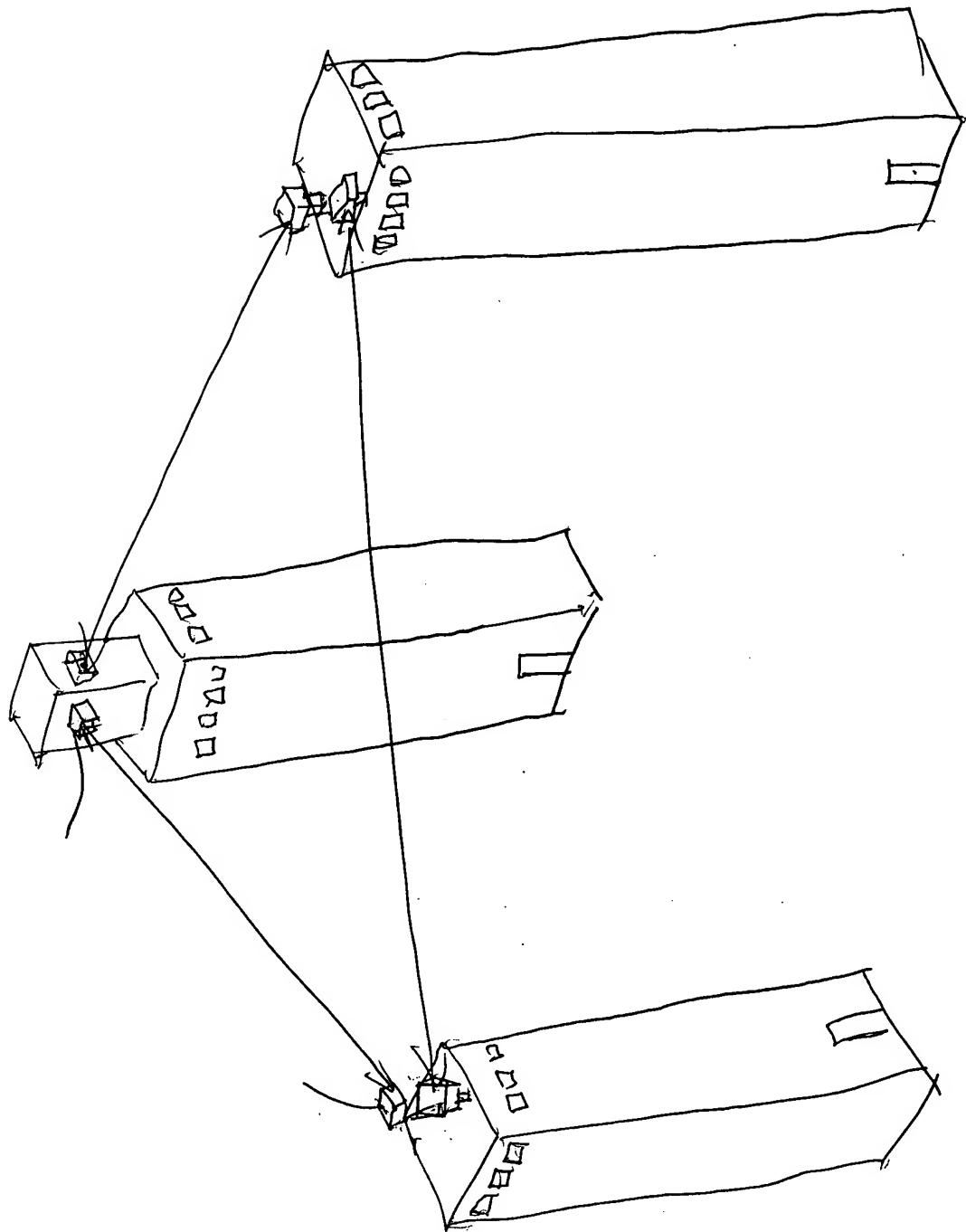
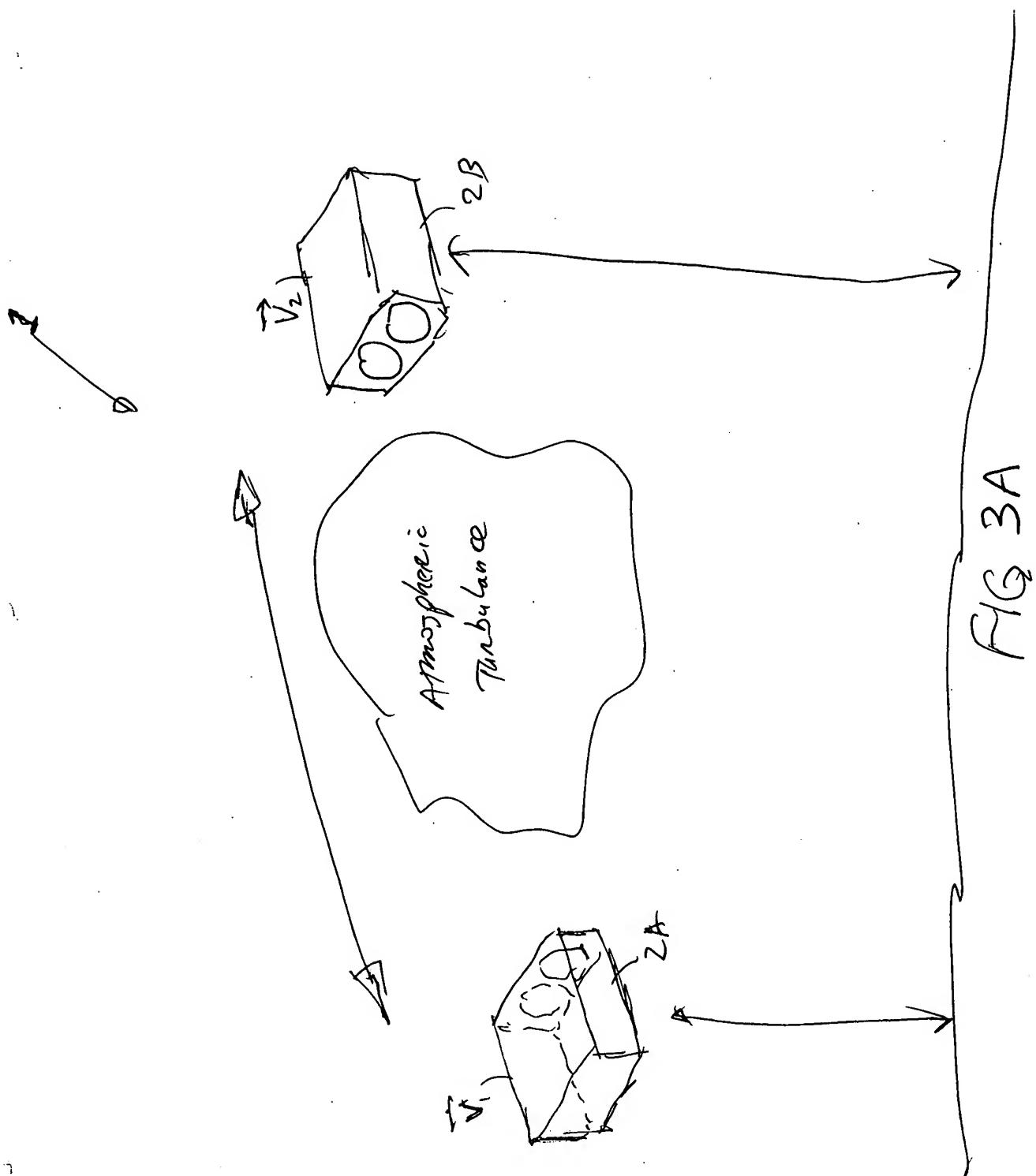


FIG. 2B

City Environment
Building - Building



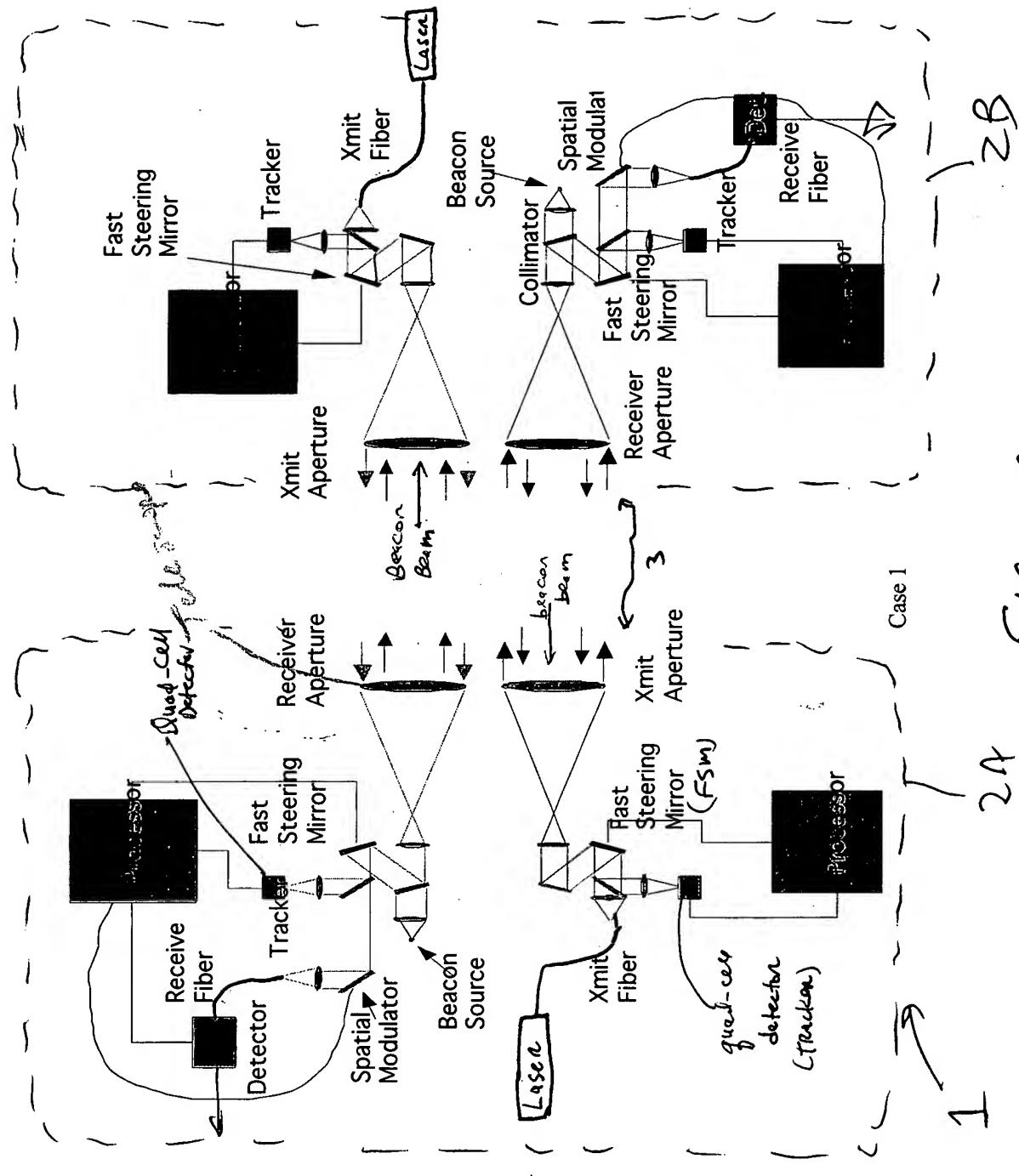


Fig. 3B

2A

2B

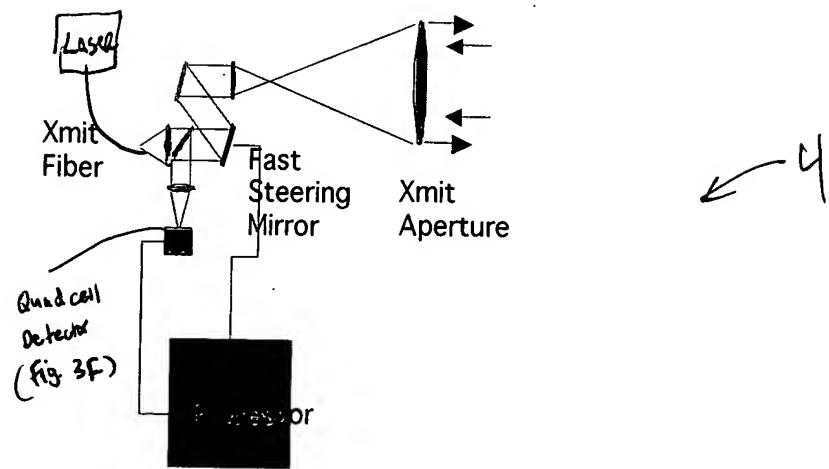


FIG. 3C

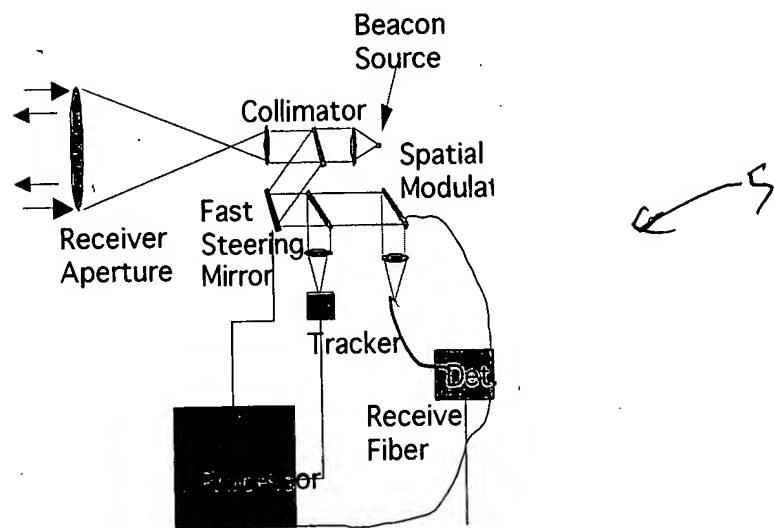
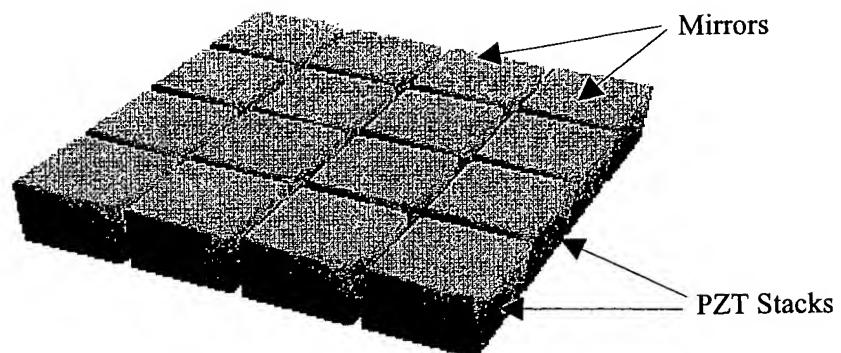


FIG. 3D



Phase Modulator

FIG. 3E

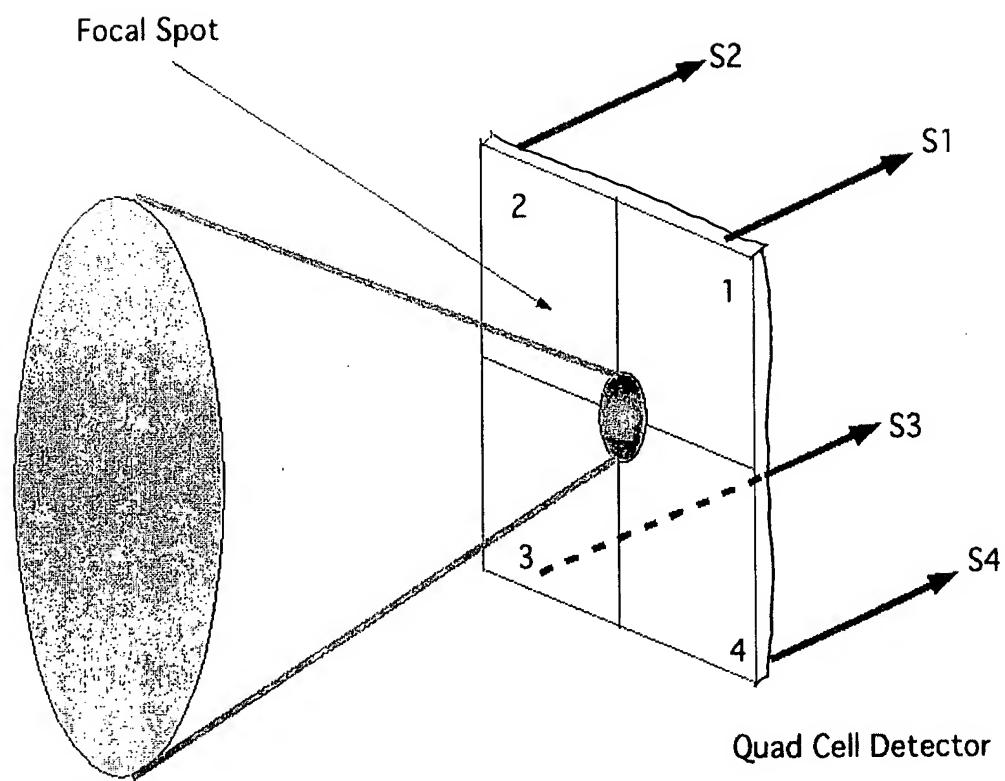
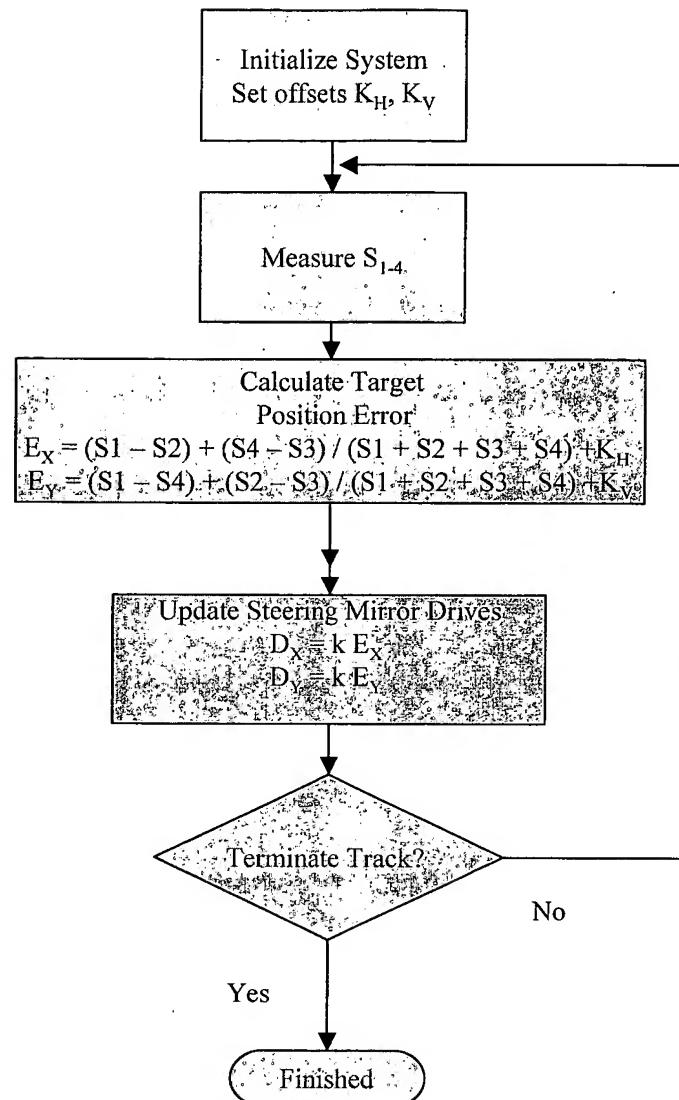


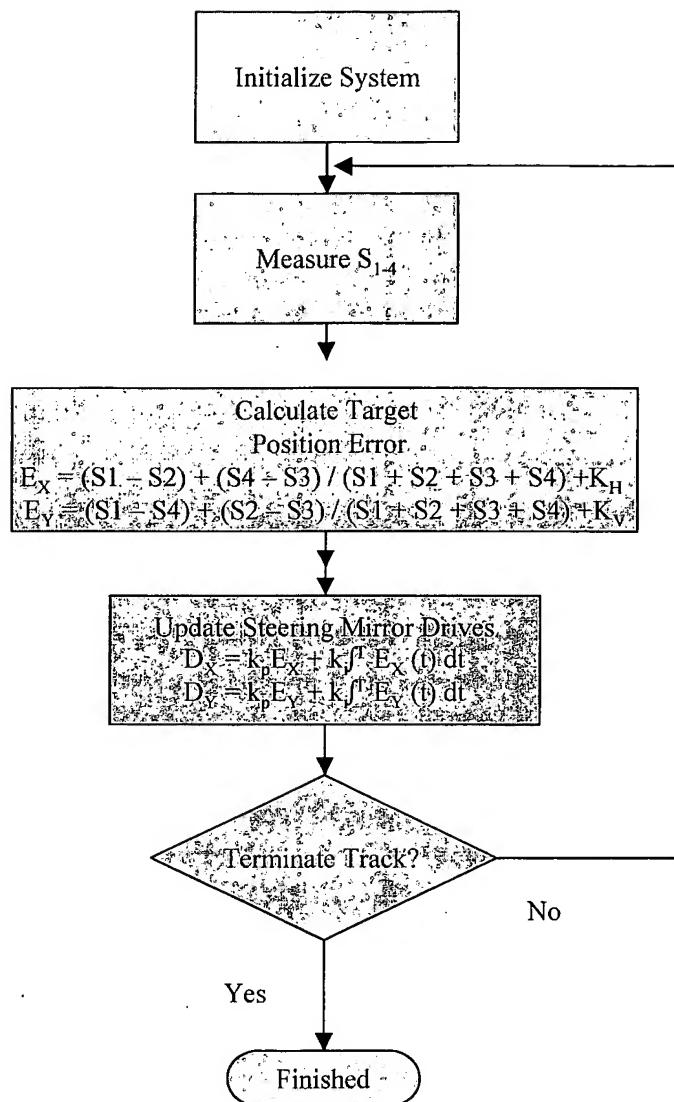
FIG. 3F



Proportional Control

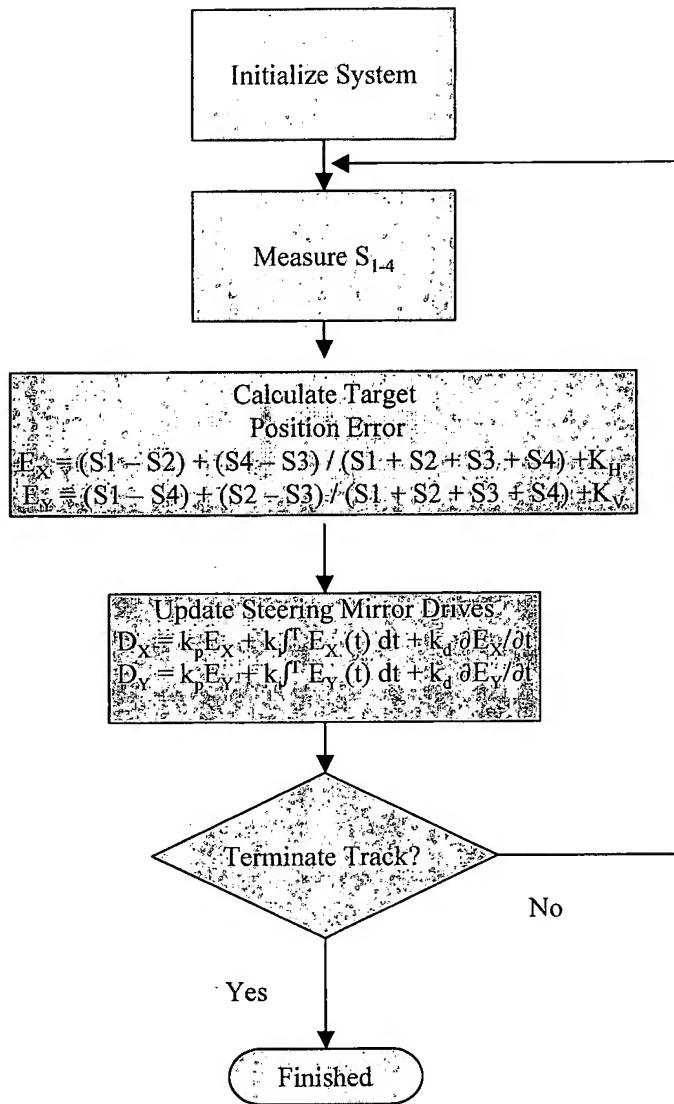
Transmitter

FIG. 4A



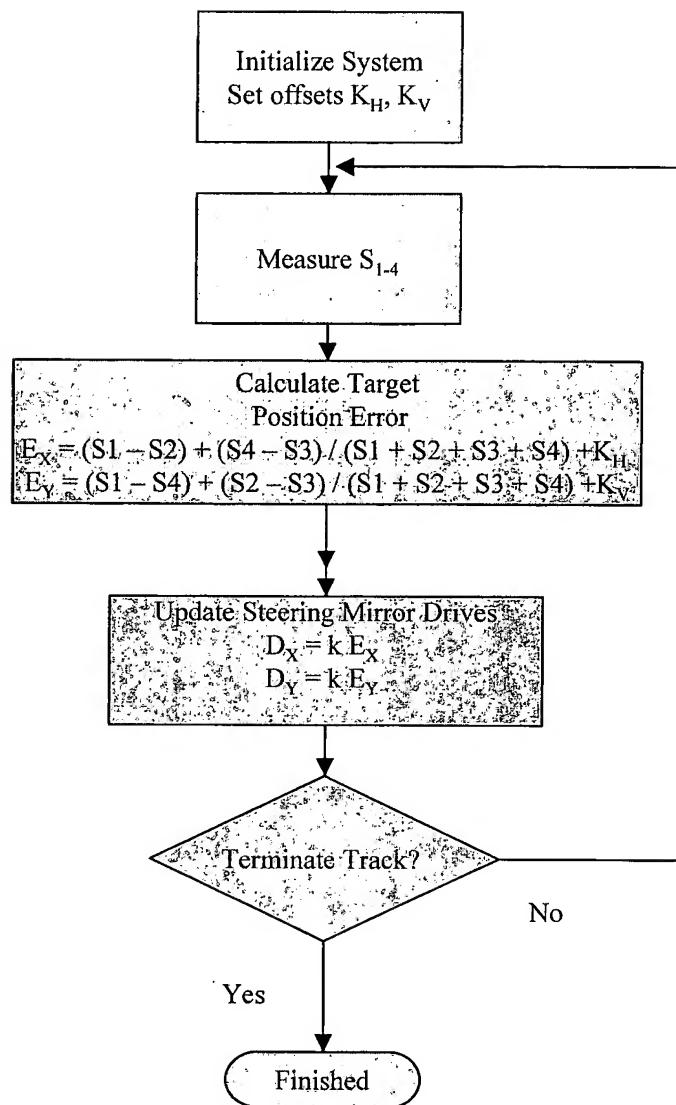
Proportional plus Integral Control

FIG. 4B



Proportional plus Integral Control plus Derivative

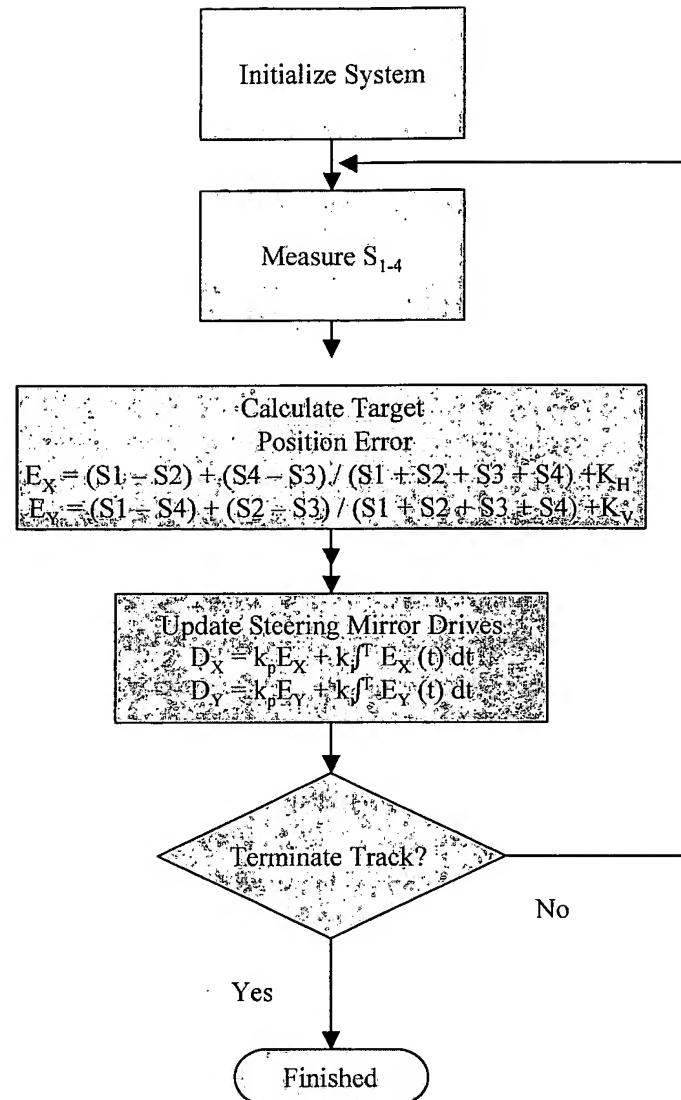
FIG. 4C



Proportional Control

Recuren

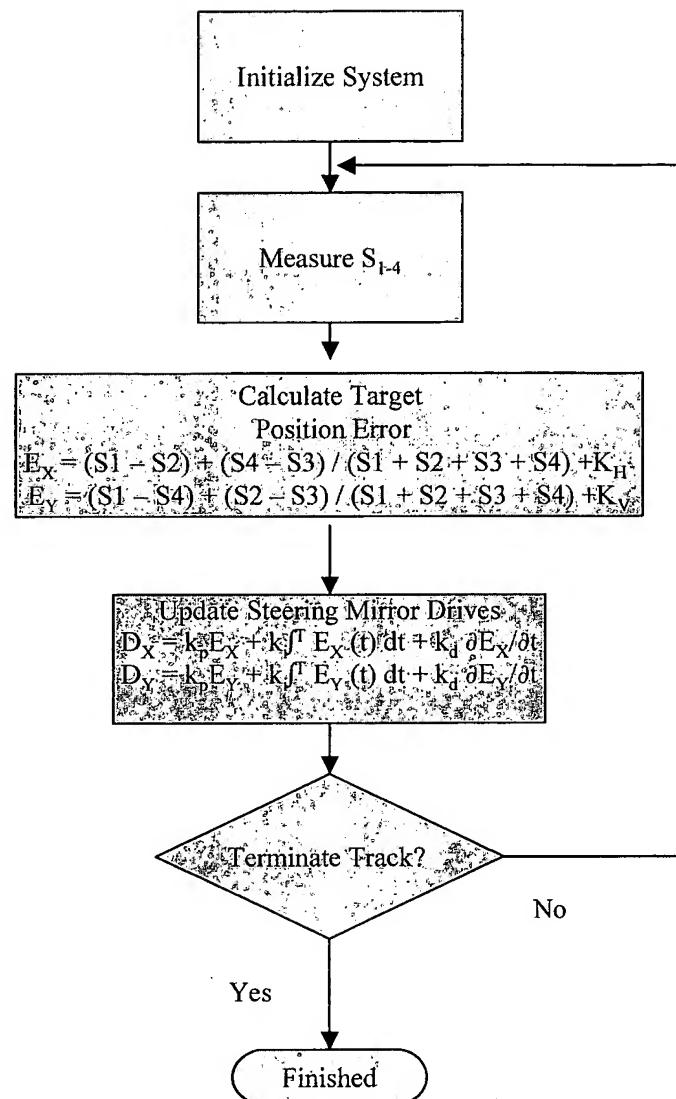
FIG. 4D



Proportional plus Integral Control

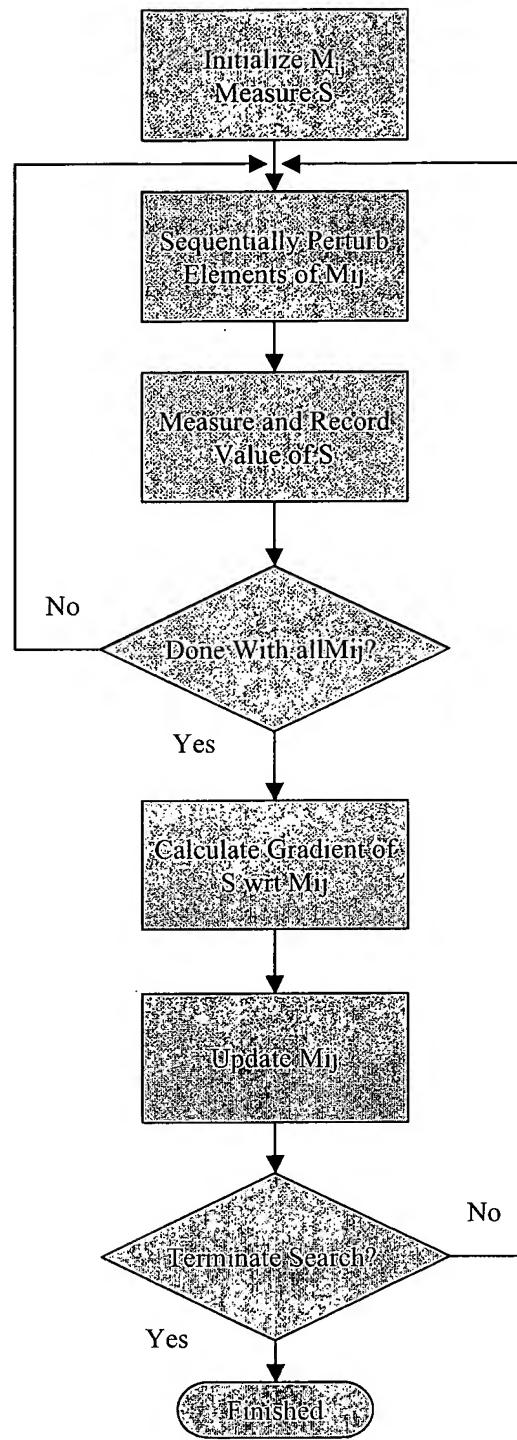
FIG. 4E

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Proportional plus Integral Control plus Derivative

FIG. 4F



SPM Control
Signal Generation
Algorithm

FIG 5A

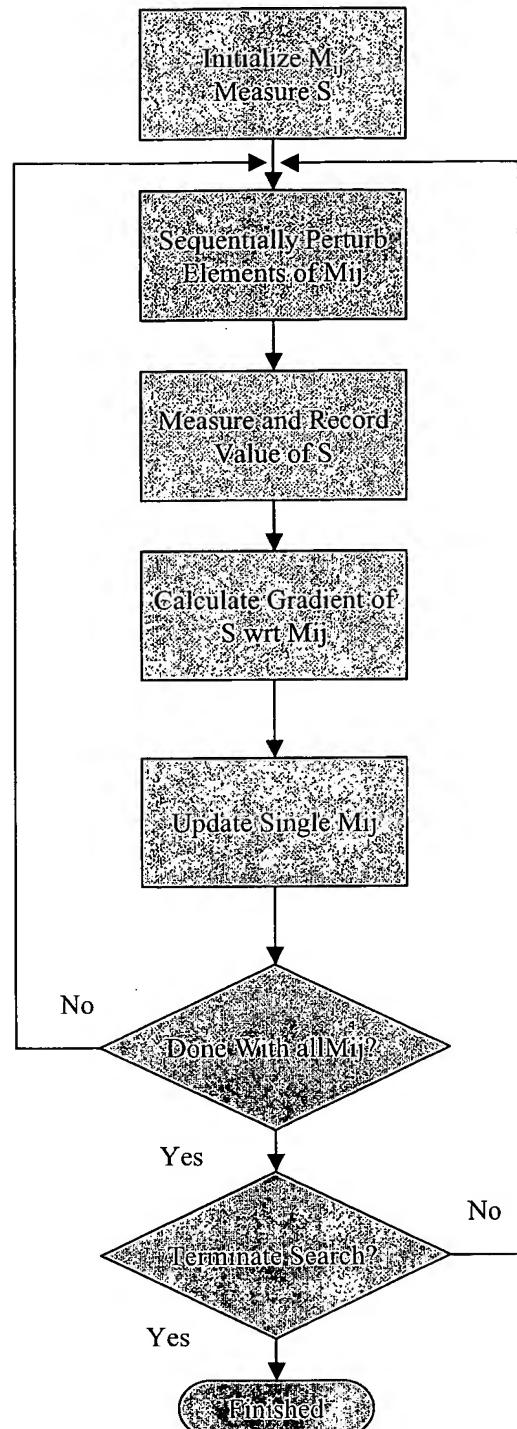
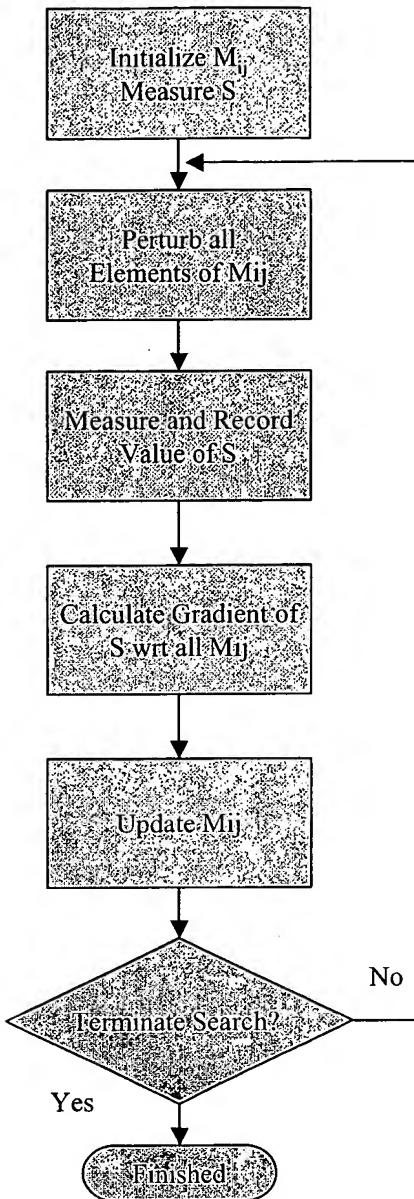


FIG 5B



AG. 5C

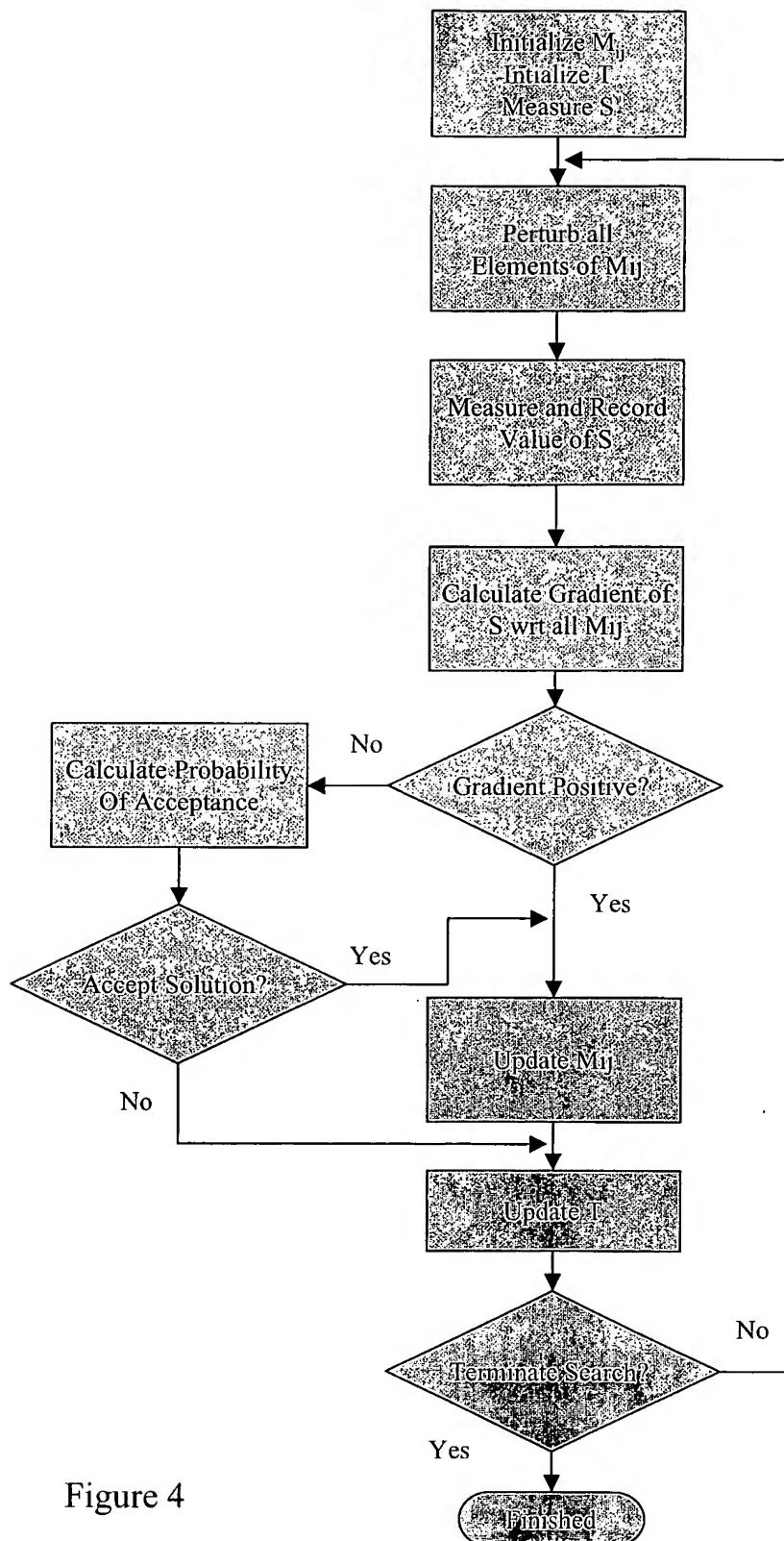
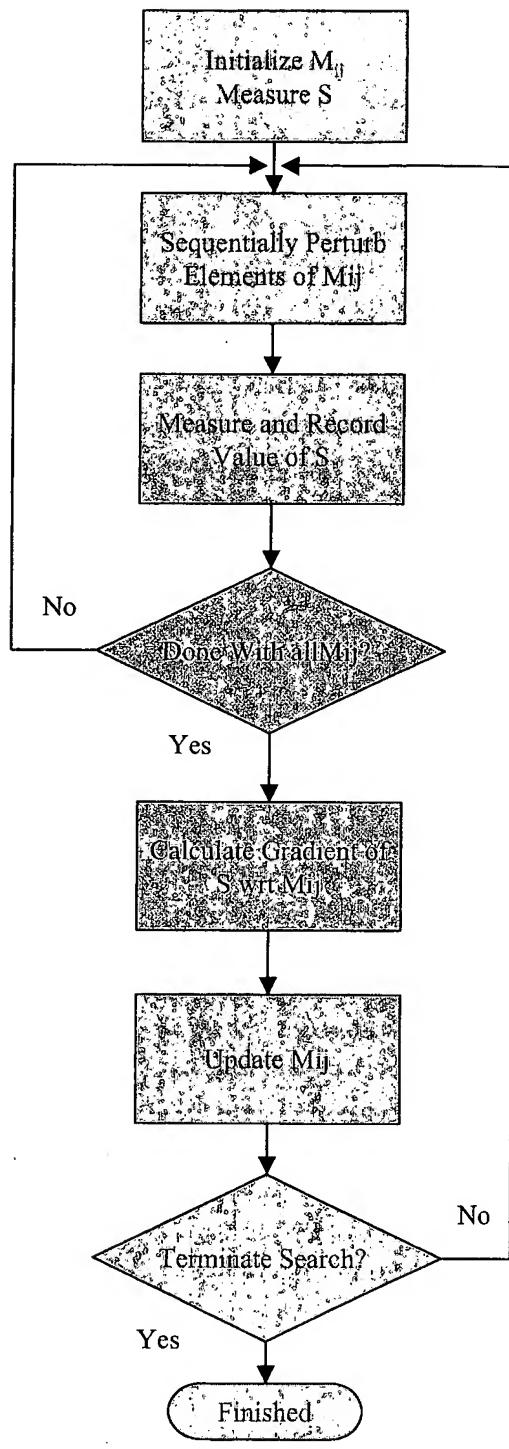


Figure 4

FIG. 85D



SIM CONTROL
Signal Generation
Algorithm

FIG 6A

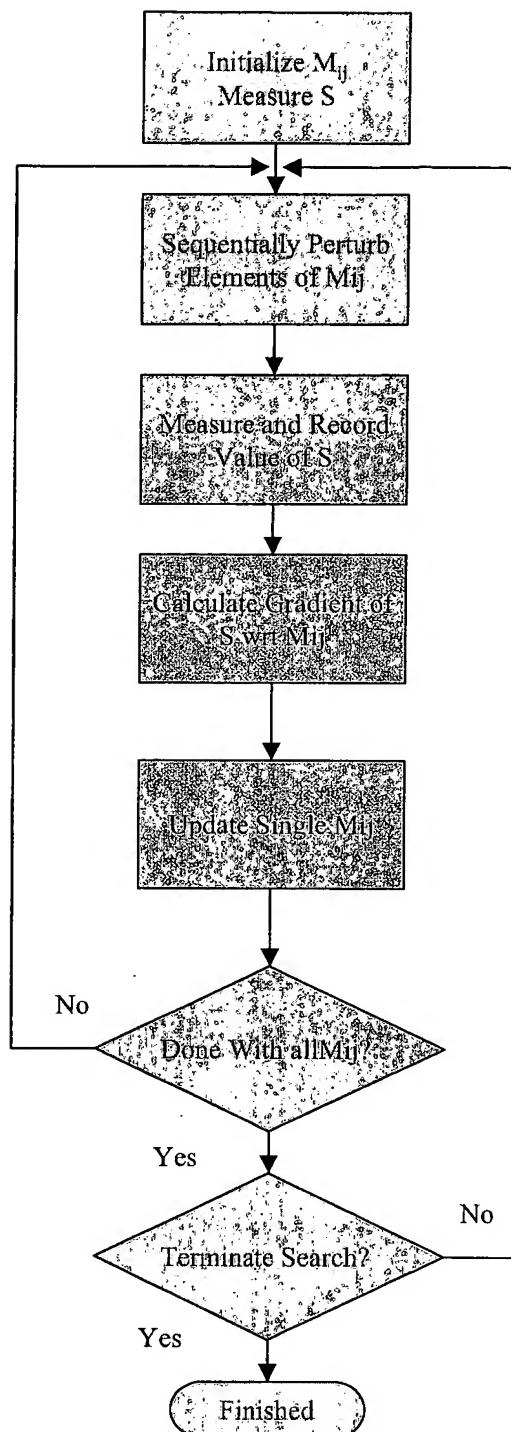


FIG-6B

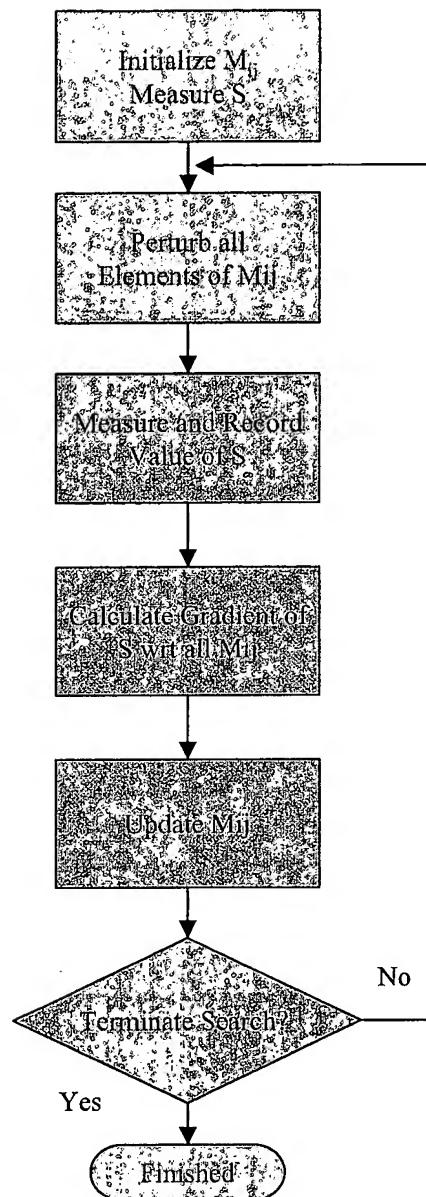


FIG. 6C

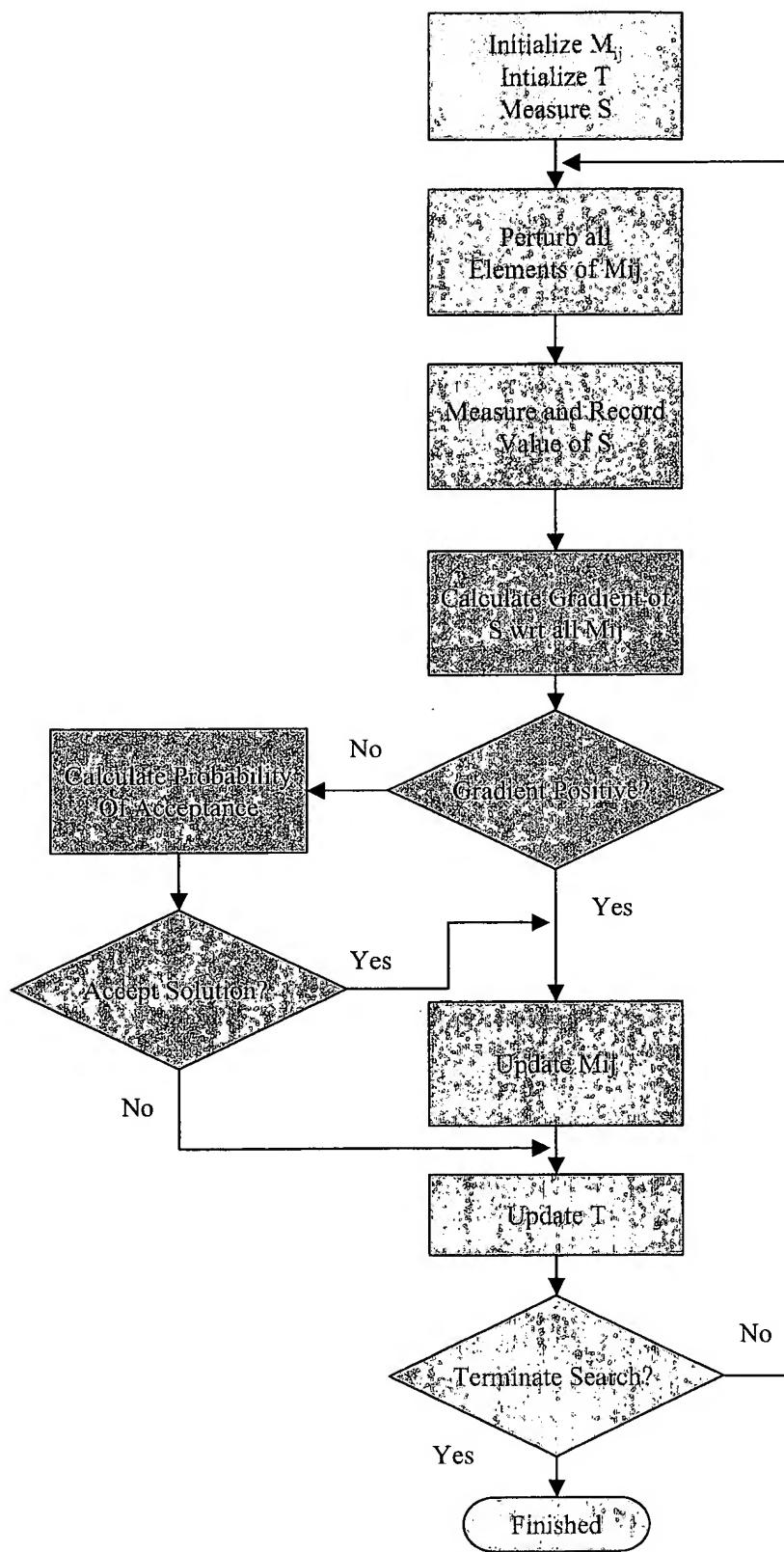


FIG. 6D

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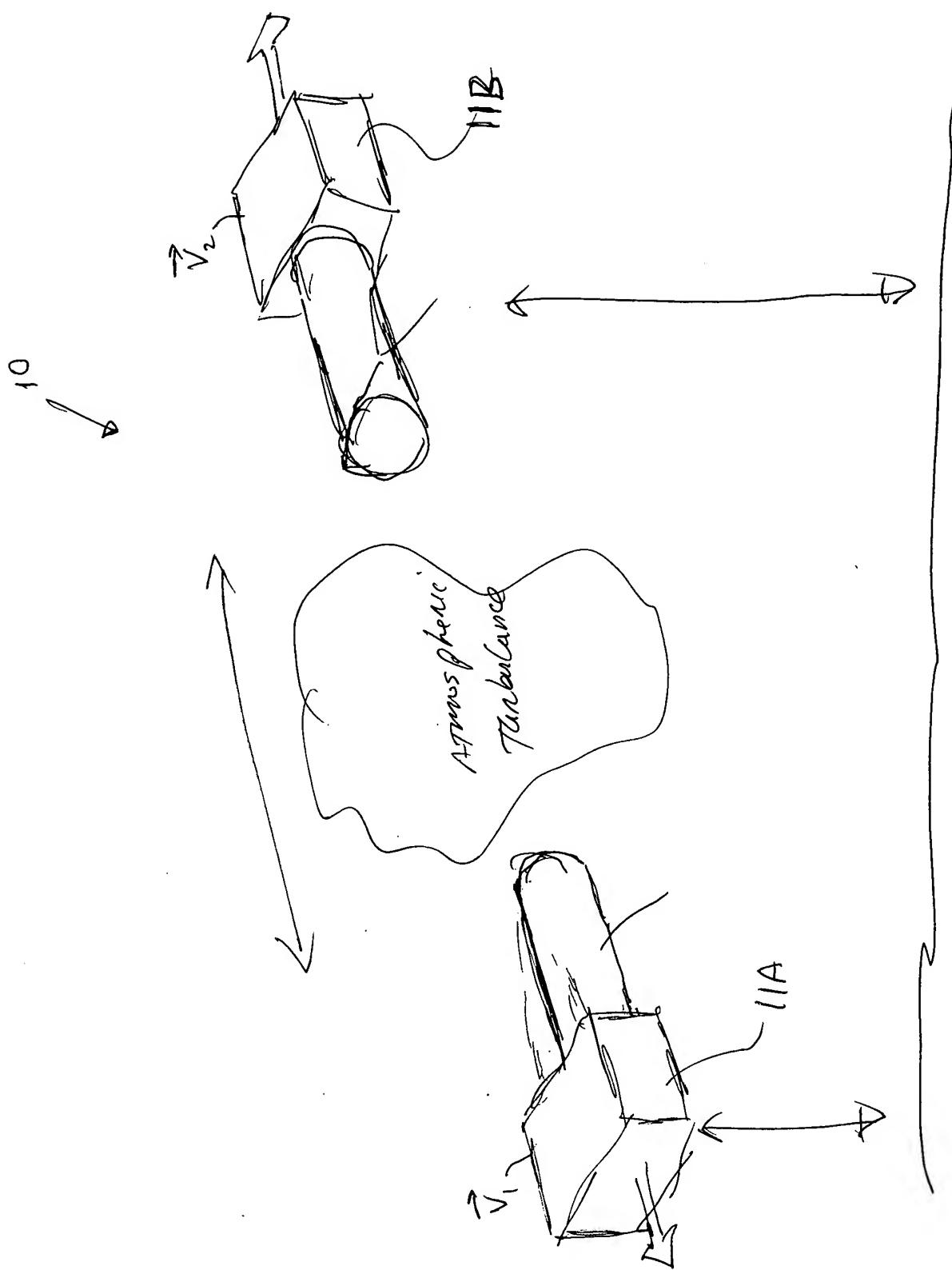


FIG. 7A

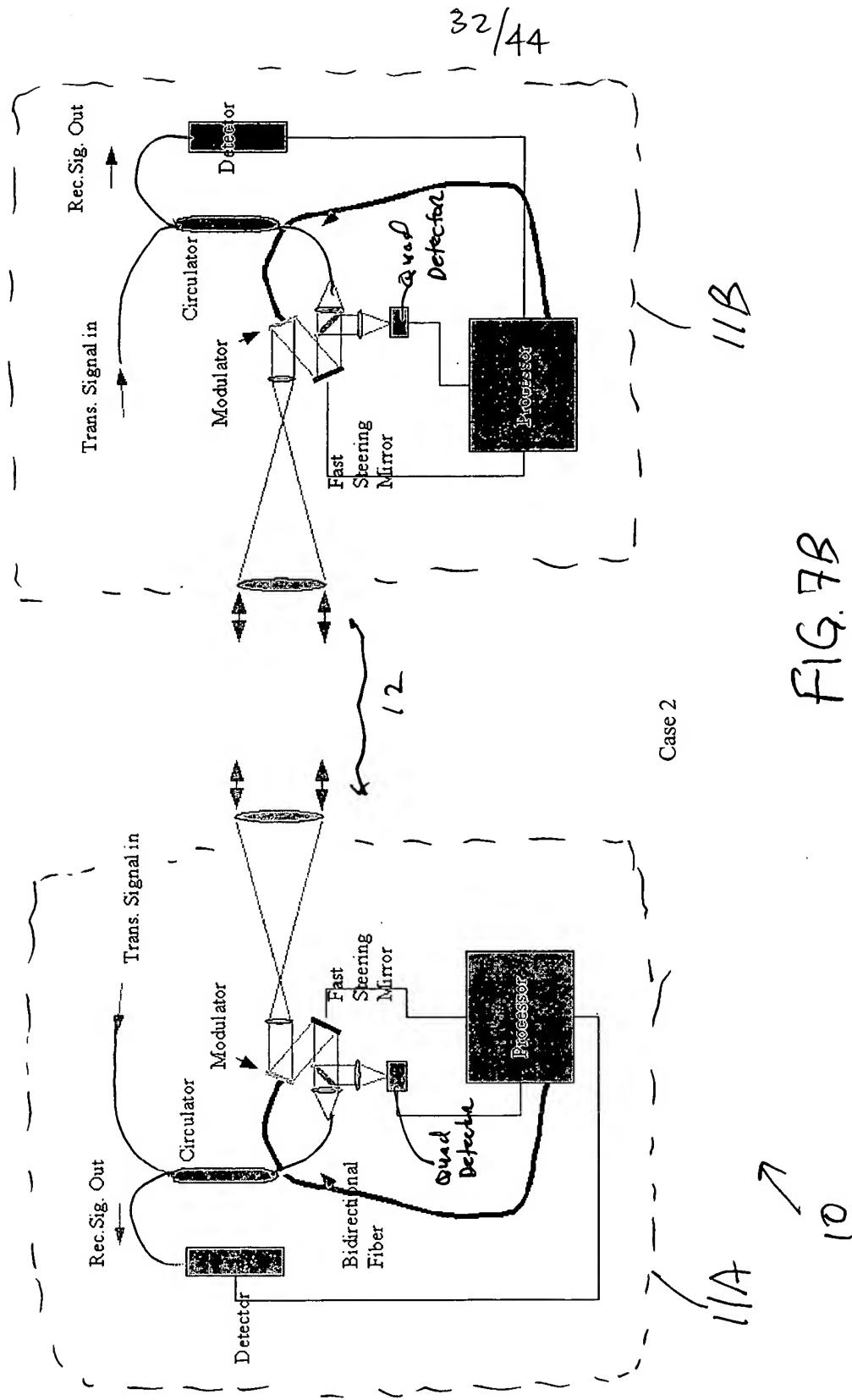
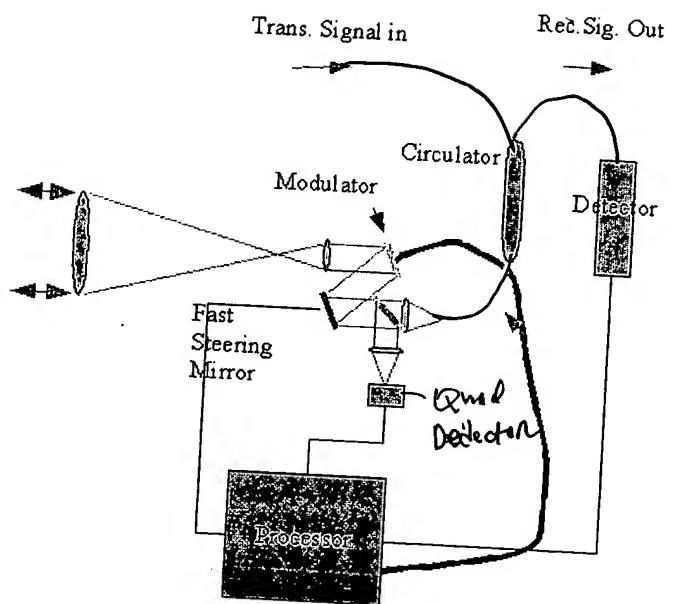
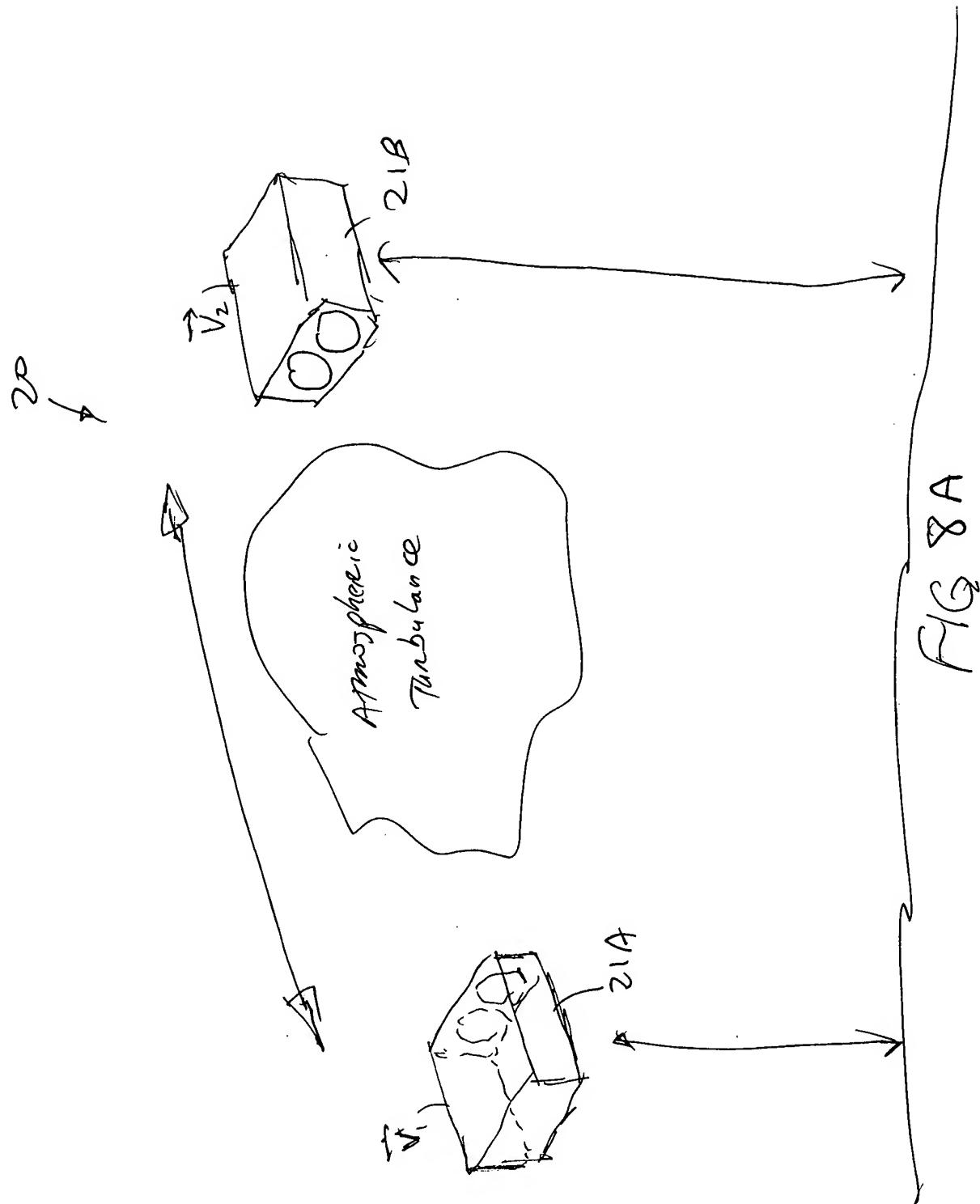


FIG. 7B



11A,
11B.

AG. 7C



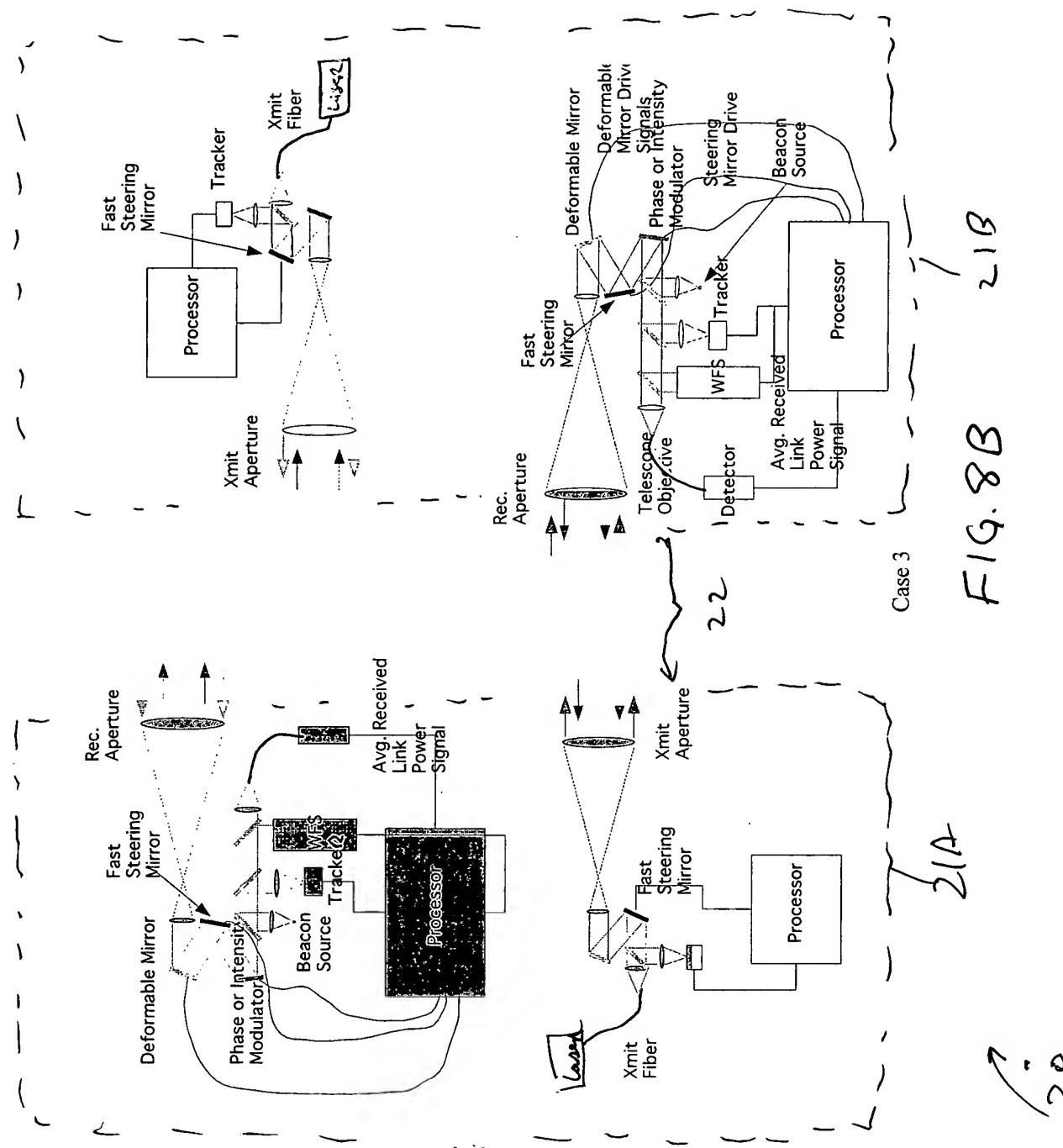
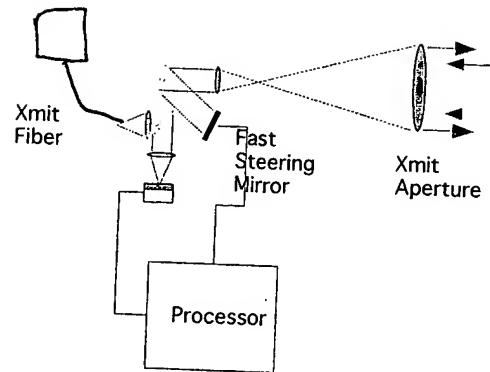


FIG. 8B

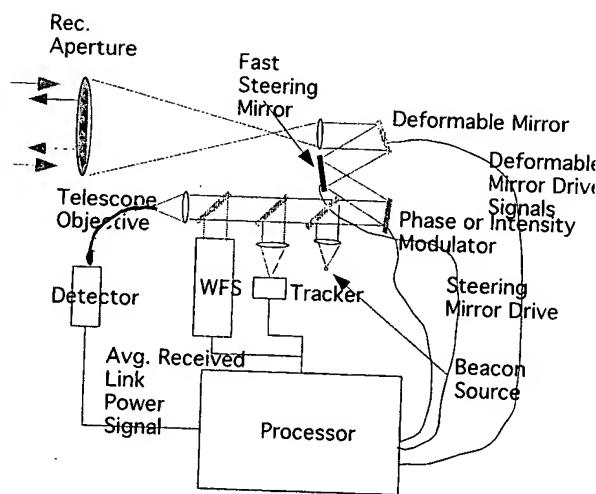
21B

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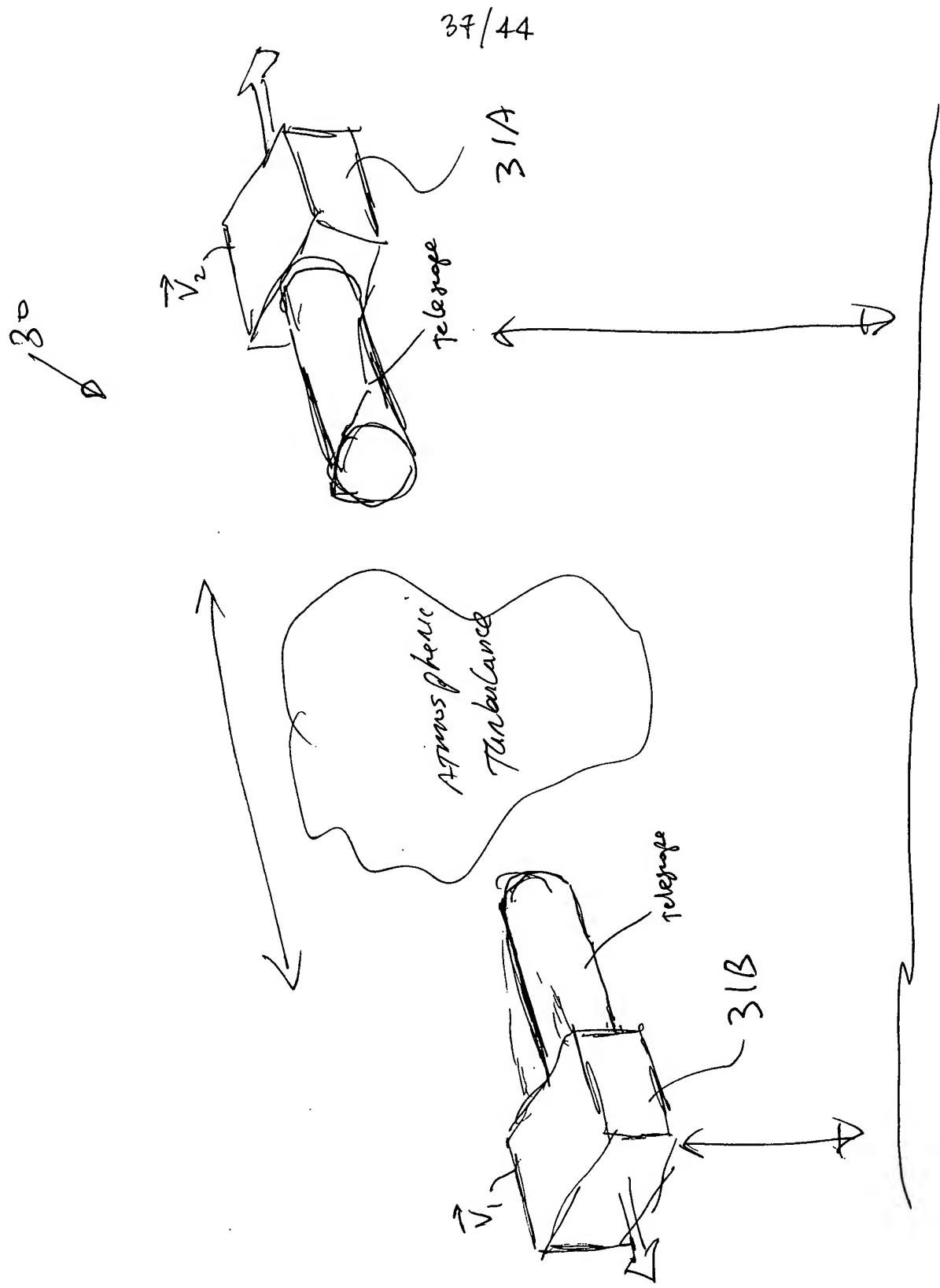
23

FIG. 8C

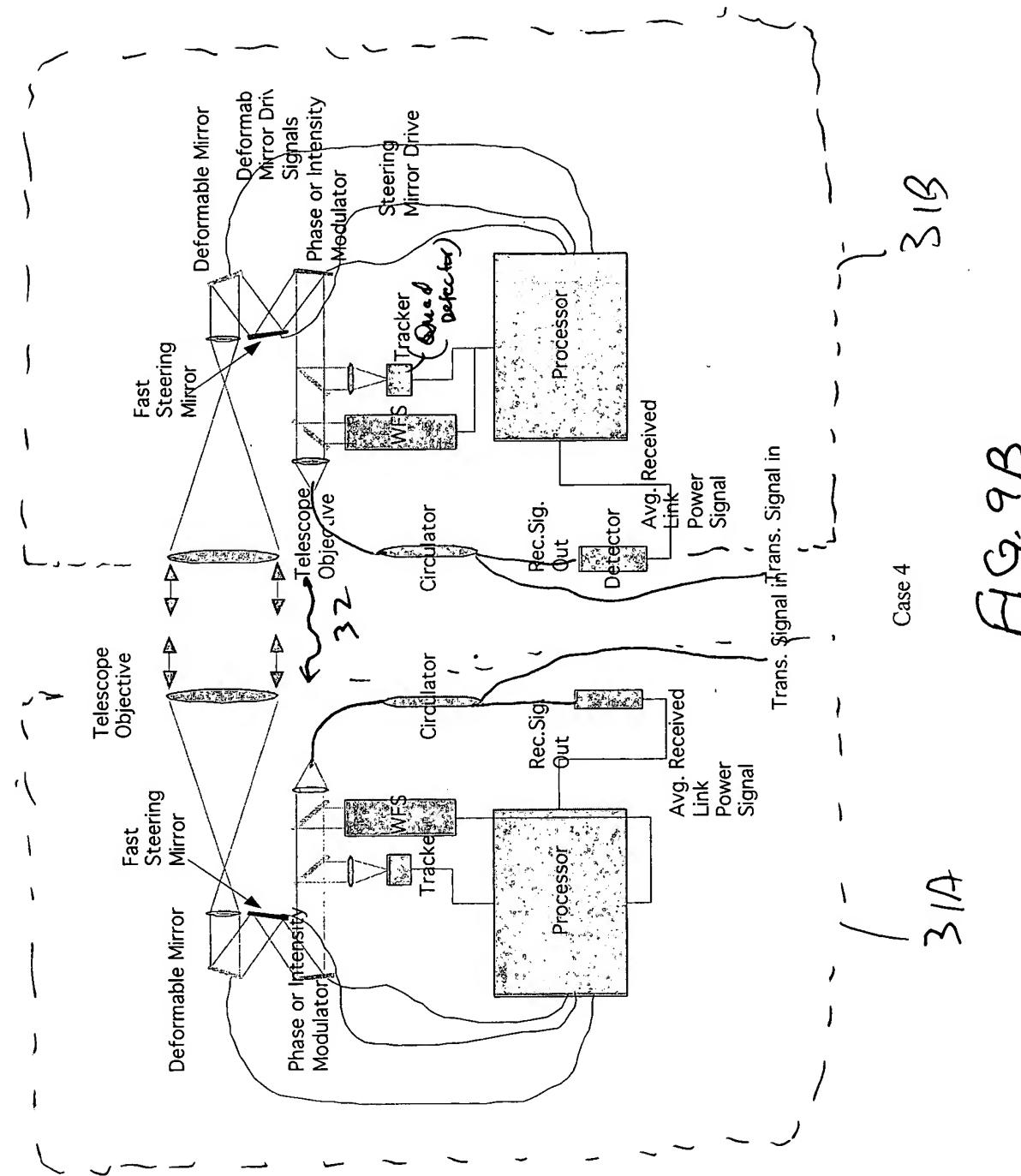


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FIG. 8D



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“Retro-reflective”

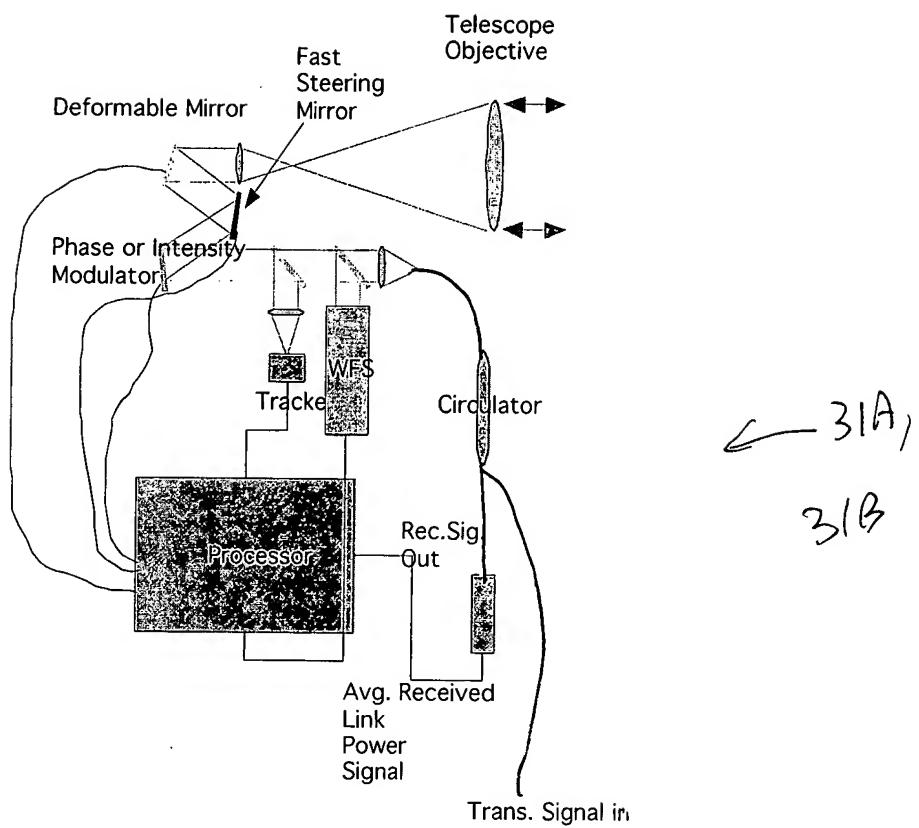


FIG. 9C

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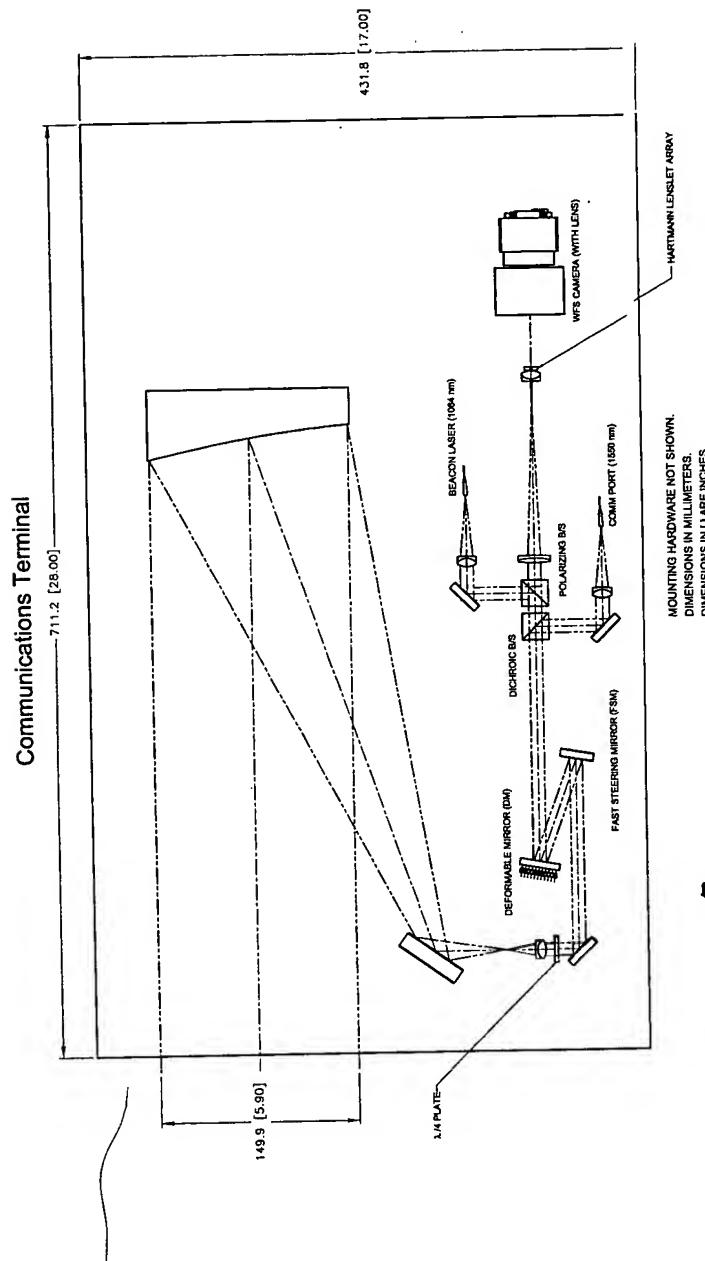
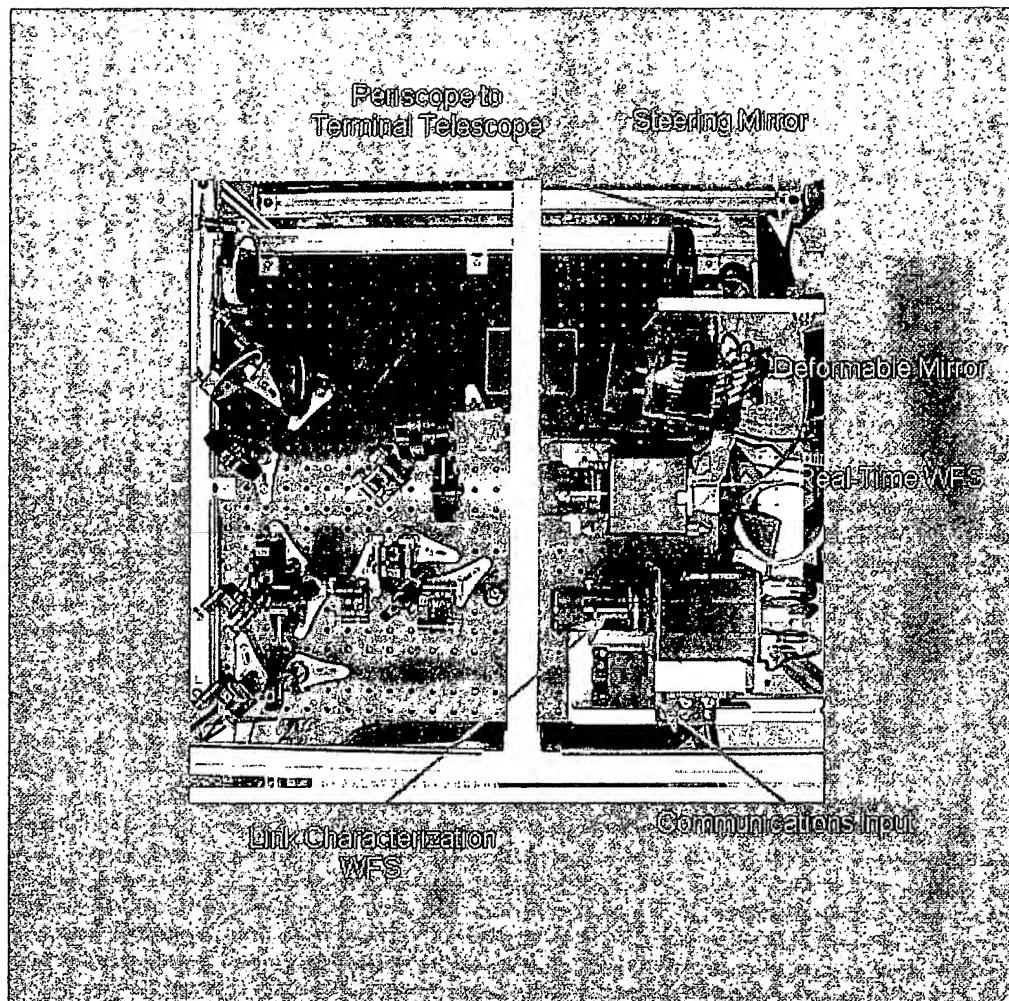


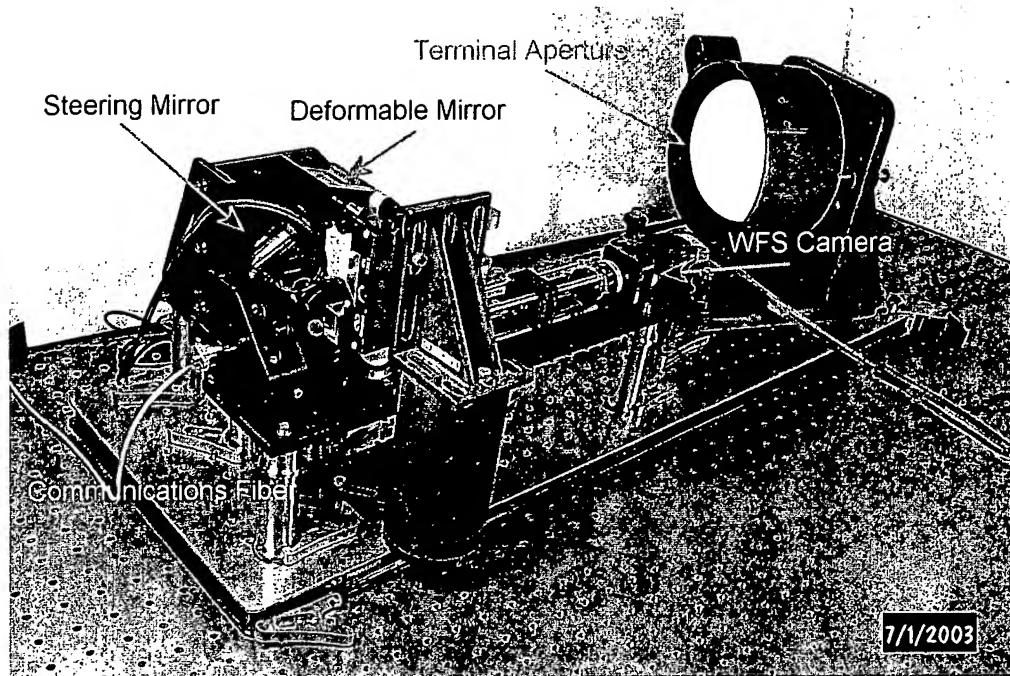
FIG 9D

31A, 31B



31A, 31B

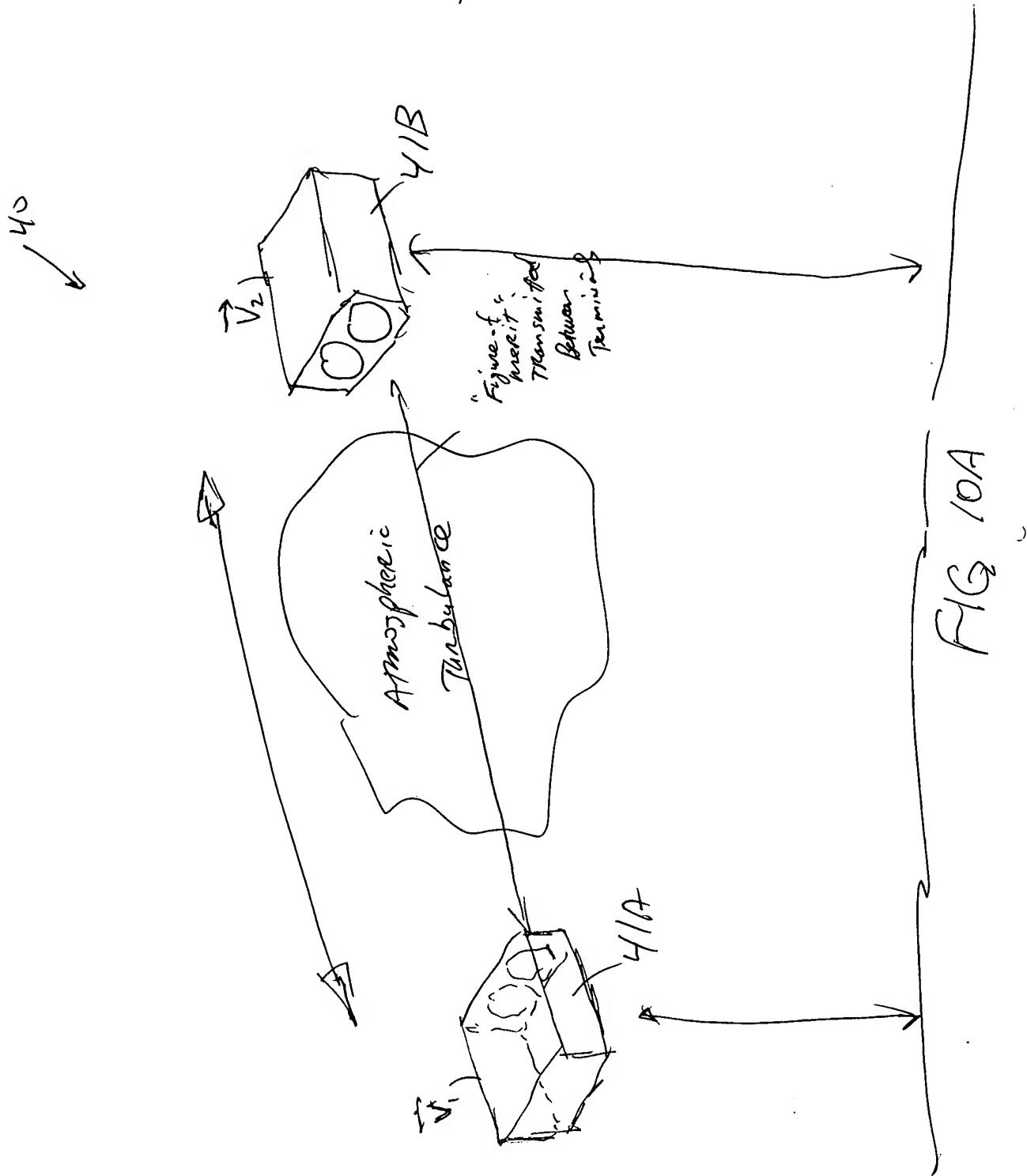
FIG. 1E



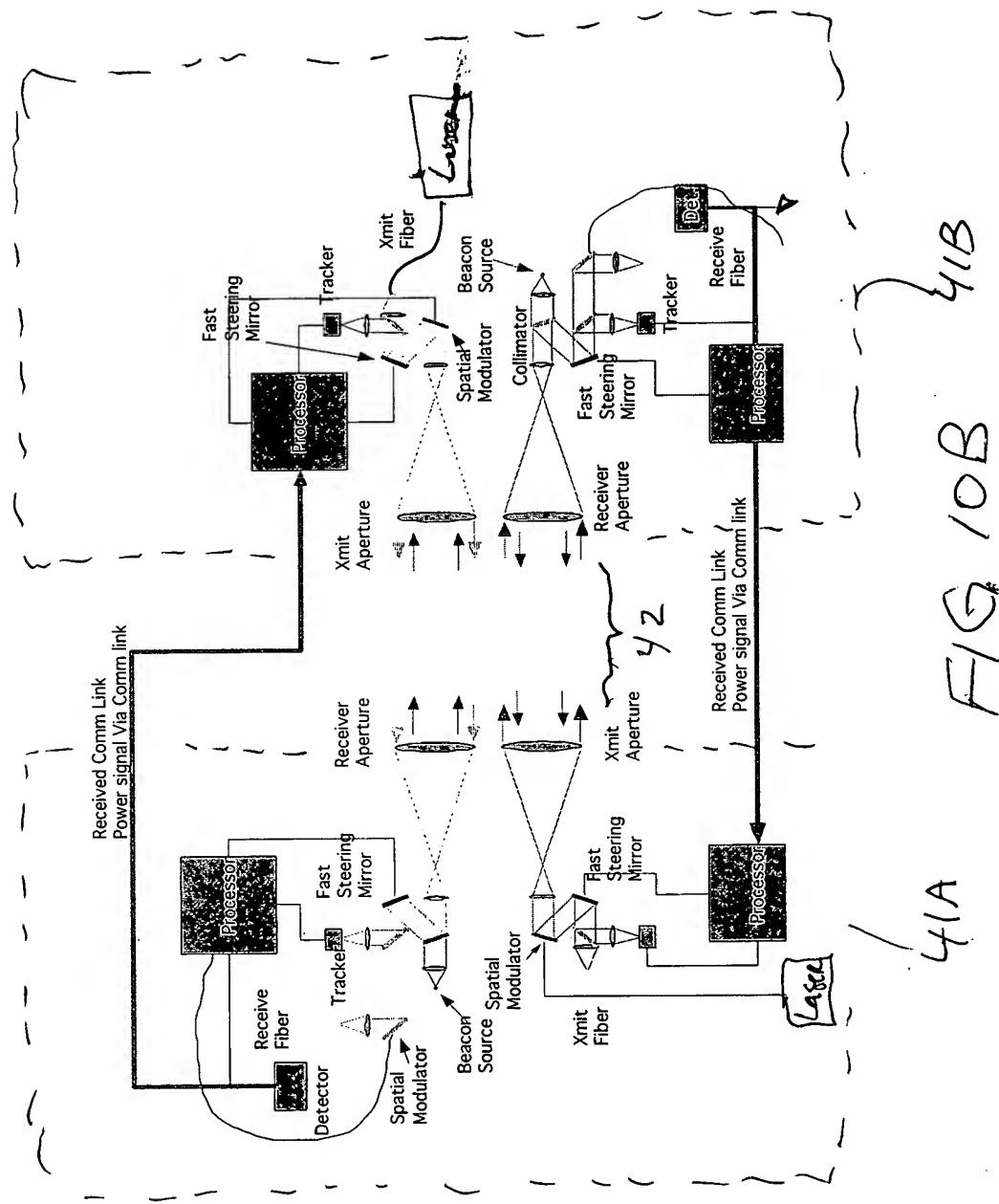
Compact laser communications terminal with 15cm aperture. This terminal has both a fast steering mirror and deformable mirror for atmospheric compensation. This terminal is set up as either a transmitter or receiver, with a separate fiber port for a tracking and AO beacon laser source (hidden by the DM mount).

These are both laser comm. terminals with traditional adaptive optics. A terminal with fade prevention would look similar. Note that these use reflecting telescopes (the one on the top has an 8 inch Schmidt Cassegrain telescope on the other side of the optical breadboard. In the schematic drawings a refracting telescope is shown for simplicity. Either can be used in practice.

FIG. 9F



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